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INFANT MANAGEMENT IN THE 18TH CENTURY WITH SPECIAL REFERENCE TO THE WORK OF WILLIAM CADOGAN

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Since the beginning of time paediatrics had been one of the most neglected branches of medicine. There are three main reasons for this. Firstly, the intimate relationship which exists between mother and baby tends to make the care of the infant merely an offshoot of the care of the mother.

The second reason is the difficulty encountered in history-taking and examining a child who is unwilling to co-operate. Even today in paediatrics greater reliance has to be placed on ancillary investigations than is necessary in adult practice. When a diagnosis has been made the problem of treatment arises. Children react to drugs differently from adults, and dosage has to be modified. Practical procedures in olden days, as now, must often have presented technical difficulties.

But the third and most important reason was the callous neglect of children in time past. Garrison wrote: "In all prehistoric and primitive phases of human development, the child is regarded as a negligible factor." [1] Among primitives, infanticide, abortion, cannibalism, and ritual sacrificing of children are the rule.[2] As Sigerist [3] pointed out, it was not

[1] F. H. Garrison: "History of pediatrics." In Isaac A. Abt (ed.): *Pediatrics.* Philadelphia and London: W. B. Saunders, vol. I, 1923, p. 2.

[2] G. H. Payne: *The Child in Human Progress.* New York and London: Putnam, 1916, p. 260.

[3] H. E. Sigerist: *Landmarks in the History of Hygiene.* London, New York: Oxford Univ. Pr., 1956, p. 20.

until the advent of Christianity, which for the first time emphasized the importance of the individual, poor or rich, slave or free, that the child was considered at all. But Christ had said, " Suffer the little children to come unto me." [4] And so in a long series of bold, vigorous pronouncements addressed directly to the people, the fathers of the Church denounced infanticide and abortion.[5]

Even when Christian enlightenment had declared the mutilation and killing of children by man to be illegal, accidents and illness continued the foul work, for the most part unchecked. Travel was tedious, communications restricted, and innate conservatism befogged the minds of physicians, excluding any experimentation. For the most part they were content merely to observe. Until the beginning of the 19th century medical periodicals were almost non-existent, and books went to many editions, or rather reprints, as they were often altered little between one printing and the next. Thus Harris's *De morbis acutis infantum* was first published in Latin in 1689 and passed through at least 18 editions in various languages, the last (in English) being in 1742. Even Cadogan's small pamphlet of 1748 [6] went through at least 10 English editions, one as late as 1772.

When the rest of medicine started to advance in the middle of the 17th century, paediatrics lagged behind. If a physician did condescend to see a child, or to write on the subject of paediatrics, it was with the excitement of illness that he was principally concerned, not with the humdrum routine of infant management. It is small wonder, therefore, that in the care of young children, " the medical profession at large had left nurses and mothers to deal with the worrisome little nuisances." [7]

But the nurses and mothers were not fitted for the work. Books had been written for them,[8] but to a large extent these perpetuated previous errors, and at any rate they probably only reached a limited section of the community. In 1748 William Cadogan, a Bristol physician, wrote a letter to the Governors of the recently opened Foundling Hospital in London, and this was published as an *Essay on Nursing and the Management of Children*. This small book was the foundation stone of modern child

[4] Matt., 19: 14.

[5] Payne, *op. cit.*, pp. 257-271, cited by Garrison, *loc. cit.*, p. 55.

[6] W. Cadogan: *An Essay upon Nursing and the Management of Children*. London: J. Roberts, 1748.

[7] O. L. Bettmann: *A Pictorial History of Medicine*. Springfield, Illinois: Thomas, 1956, p. 195.

[8] e. g. Anon: *The Nurses Guide* or the right method of bringing up children. London, p. 48.

care and will be frequently referred to in the following article. (The page references refer to the 1st. edition). It was Cadogan's hope that the London Foundling Hospital would not only be able to salvage many infants otherwise doomed to die, but also that the opportunity would be taken to present rational methods of infant care.[9]

Cadogan in his *Essay* wrote scathingly of those who, because of traditional prejudices, "are capitally mistaken in their management of children." [10] He believed that the treatment of children at that time was wrong, unreasonable, and unnatural.[11] For proof he referred to the London Bills of Mortality: those remote ancestors of the Registrar-General's returns. The Bills were compiled by parish clerks on information received from searchers—"ancient matrons sworn to their office." [12] They were often inaccurate as to the cause of death, but at least they gave some indication of the number and ages of those dying at a given time. Cadogan pointed to the tragic fact that "almost half of those who fill up that black list die under 5 years of age." [13] He remarked that he knew of no man who had ever given the fact serious consideration, yet, "In my opinion this business has been too long fatally left to the management of women who cannot be supposed to have proper knowledge to fit them for such a task." [14]

At that time midwives were still licensed by the Bishop of the diocese who was concerned with their morals, not with their medical knowledge. In 1726, the Incorporation (later the Royal College) of Surgeons of Edinburgh remarked on the great dangers, "To women in childbirth and to their children through the ignorance and unskilfulness of midwives . . . who enter upon that difficult sphere at their own hand, without the least trial taken of their knowledge of the principles upon which they practice that art." [15]

William Smellie, in his treatise on midwifery written in 1752, has given us some insight into the barbaric practices of these women in their handling of the mothers—the slapping and the hurrying, and the

[9] Cadogan, *op. cit.*, p. 3.
[10] *Ibid.*, p. 4.
[11] *Ibid.*, p. 5.
[12] J. Graunt: *Natural and Political Observations Mentioned in a Following Index and Made upon the Bills of Mortality.* London: John Martin, etc., 1st. ed. 1662. Reprinted by C. H. Hull in *The Economic Writings of Sir W. Petty.* Cambridge: University Press, 1899, vol. 2.
[13] Cadogan, *op. cit.*, p. 6.
[14] *Ibid.*, p. 3.
[15] R. W. Johnstone: *William Smellie.* Edinburgh, 1952, p. 31.

pulling on the presenting parts with filthy hands.[16] If the infant emerged from the womb unscathed, he now had to suffer the midwife's ministrations at closer quarters. Moss,[17] in 1781, inveighed against nurses and midwives who claimed a prerogative of the subject, and as late as 1815 Clarke wrote that the care of children had received so little attention because midwifery was committed "to women only, and those generally of the most ignorant description."[18] Fellows of the Royal College of Physicians, because of a bye-law "are compelled to exclude themselves from practising midwifery and thus from acquiring such knowledge of the diseases of infants and children." (This clause was abrogated on March 31, 1835.)[19] Smellie himself made no pretence of knowing much about infants and recommended his pupils to read "Cadogan's letter on the nursing of children."

The Clothing of Infants.

The swaddling of infants certainly extends back to Biblical times. In the Apocrypha we read, "I was nursed in swaddling clothes . . . for there is no king that had any other beginning at birth,"[20] and the Christmas story tells of the Baby Jesus "wrapped in swaddling clothes and lying in a manger."[21] The reason for swaddling was stated by Pechey as follows: "After bathing the infant must be be swathed up lest it should move its hands or feet too freely and thereby distort the bones which are very flexible, but after four months the hands and arms may be let loose, but the whole breast and belly must be swathed for above a year to comfort the heart and defend the parts."[22] The anonymous author of *The Nurses Guide* of 1729 seems to have assumed that his charges would be swaddled, because he suggested that one of the reasons for a child's crying might be that "he is swaddled too strait," or that "his ordure or excrements make him smart." Andry gave careful directions for swaddling, saying that: "The most part of children that are rickety owe that

[16] William Smellie: *A Treatise on the Theory and Practice of Midwifery.* London: Wilson, 1752; 2nd ed., 1752, vol. I, p. 454.

[17] W. Moss: *An Essay on the Management and Nursing of Children. . . .* London: Johnson, 1781.

[18] John Clarke: *Commentaries on Some of the Most Important Diseases of Children.* London: Longman, 1815, p. 20.

[19] L. M. Payne: Personal communication, 1953.

[20] Wisdom of Solomon, 7: 4.

[21] Luke, 2: 7.

[22] J. Pechey: *A General Treatise of the Diseases of Infants and Children.* London, 1697, p. 3.

disease to the ill manner in which they are swaddled." [23] Tight swaddling was to be avoided, "that is to say that wretched custom established amongst nurses, of tying tender infants hard and fast with swathing bands as if they were packing up goods to send abroad." Astruc suggested that underneath the swaddling bands there should be "compresses 3, 4 or 5 times doubled" which should be pinned "to the customary cap and applied to the mold of the head which is very thin, sensible and extremely susceptible of cold." [24]

It is thus apparent that up to the middle of the 18th century babies were ordinarily swaddled. No voices were raised against the monstrous habit with the possible exception of Conyers in 1748 [25] and Locke in 1690.[25a] To Cadogan therefore must go the praise for setting babies free. In his essay he described the state of affairs as he saw it and then gave details of how the babe should be dressed.[26] By day he should wear, "a little flannel waistcoat without sleeves, made to fit the body and tie loosely behind, to which there should be a petticoat sewed, and over this a kind of gown of the same material, or any other that is light, thin and flimsy. The petticoat should not be quite so long as the child, the gown a few inches longer." For night wear all that was required was a loose, thin flannel shirt.

What effect did Cadogan's pamphlet have? James Nelson, an apothecary writing on the education of children in 1753,[27] had certainly read the *Essay*, as he quoted with approval Cadogan's views on breast feeding. But he described "the common practice with regard to dress," although it is difficult to be certain whether he condemned or approved. He wrote that for several months the baby wore a stay to the neck and at the end of a month it was "coated," which presumably meant that the swaddling clothes were left off. From that time until it was a year old the child wore a stay around the waist. (Fig. 1) At first the stays were soft, but as the child grew older the stays became stiffer. (Fig. 2) Boys wore stays until they were "breeched" at 6 or 7 years, girls throughout their lives.

[23] N. Andry: *Orthopaedia* or the Art of Correcting and Preventing Deformities in Children. . . . Translated from the French. 2 vols., London: Millar, 1743, vol. I, p. 216.

[24] J. Astruc: *A General and Compleat Treatise on All the Diseases Incident to Children from Their Birth to the Age of 15 Years.* London: Nourse, 1746, p. 12.

[25] R. Conyers: *De morbis infantum.* London: Nourse, 1748, p. 15.

[25a] J. Locke: *Some Thought Concerning Education.* London, 1690, 11th ed., 1745, p. 13.

[26] Cadogan, *op. cit.*, p. 11.

[27] J. Nelson: *An Essay on the Government of Children* under 3 Heads. viz. Health, Manners and Education. London, 1753, p. 109.

Fig. 1. "Gerard Anne Edwards in his Cradle" by William Hogarth.
To show clothing of infant of about one year old. (Blinkhorns, Banbury)

Theobald [28] in his *Young Wife's Guide in the Management of Her Children* was obviously deeply influenced by "the ingenious Dr. Cadogan," as he called him. Whole sentences were quoted verbatim from Cadogan's *Essay*, although it is often not indicated that this had been done. On the subject of dress Theobald recommended the clothes Cadogan had described. Tissot [29], Smith [30] and Armstrong [31] all mentioned that the infants' clothing should be loose.

A physician who must have exercised a large and beneficial influence on the welfare of children in the second half of the 18th century was William Buchan. Born in Scotland in 1729, he qualified in medicine in Edinburgh and then went to a branch of the Foundling Hospital in Ackworth, Yorkshire. This had been founded in 1759, and Buchan was probably the first medical officer.

While at Ackworth Buchan wrote his inaugural dissertation *De infantum vita conservanda*, which was read and published in Edinburgh in 1761. This had a chapter on clothing infants in which Buchan said, "The more loosely a newborn baby is clothed the better according to Dr. Cadogan. The truth of this statement will be obvious from the subsequent arguments." [32] The reasons against overdressing which he then advanced were mainly culled from Cadogan. Indeed the whole dissertation obviously owed a great deal to the *Essay*. This is not surprising. Cadogan's pamphlet was the textbook on infant management in the Foundling Hospital, and several copies have been found among the old papers of the Hospital.[33]

Buchan is known best for his *Domestic Medicine*, first published in 1769. This book went to at least twenty editions. In the Advertisement or Preface at the beginning he wrote: "Most of the observations contained in the first chapter were made in the Foundling Hospital at Ackworth and communicated to the public several years ago in a pamphlet addressed to the governors of that hospital." [34] In the first chapter

[28] J. Theobald: *A Young Wife's Guide in the Management of Her Children*. London, 1764, p. 7.

[29] S. A. D. Tissot: *Advice to the People in General with Regard to Their Health*. . . . Translated from the French by J. Kirkpatrick. London: Becket and De Hondt, 1765, p. 383.

[30] H. Smith: *Letters to Married Women*. London: Kearsley, 1767, p. 85.

[31] G. Armstrong: *An Account of the Diseases Most Incident to Children*. . . . London: Cadell, 1777, p. 166.

[32] W. Buchan: *Dissertatio medica inauguralis de infantum vita conservanda*. Edinburgh: Hamilton, Balfour, 1761, p. 13.

[33] Archivist, London County Council: Personal communication, 1953.

[34] W. Buchan: *Domestic Medicine* or the Family Physician. Edinburgh, 1769, 1st ed., p. xvii.

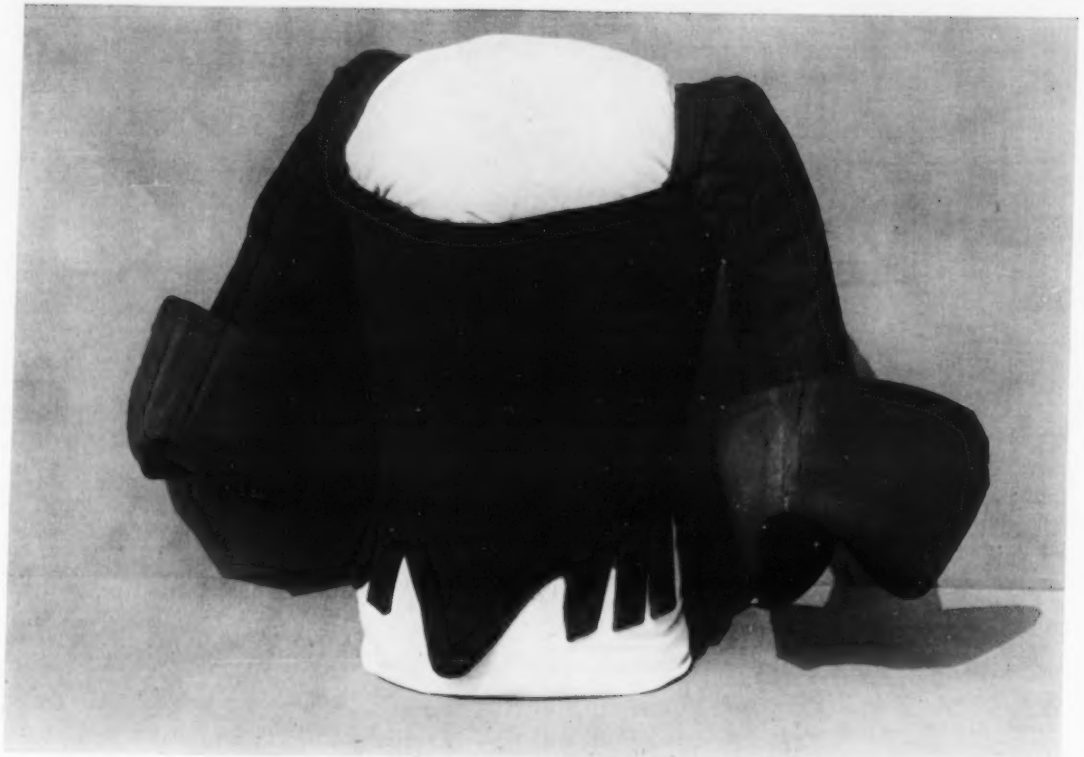

Fig. 2. Young boy's boned bodice, 1730-32.
(From the Manchester City Art Galleries by kind permission.)

Cadogan was not mentioned, but the statements made were very similar to those in the *Essay*. It is interesting to speculate on the communication to the Governors of the Foundling Hospital. No such letter has so far been found in the old papers of the Foundling Hospital, nor is there any evidence of the pamphlet being printed. It would be a singular coincidence if two such letters were written to governors of the Foundling Hospital expressing identical views at much the same time. It is possible that Buchan was referring to his inaugural dissertation, but it seems much more likely that he hoped that people would think he had written Cadogan's *Essay*, which had originally been published anonymously. In later editions of his book Buchan omitted the statement regarding the pamphlet addressed to the governors of the Foundling Hospital (*see* ed. 25, 1813), and eventually he made complete restitution, for in his *Advice to Mothers* published in 1803, he added an appendix, the footnote of which stated:

> When I first turned my attention to the nursing and management of children, the late Dr. Cadogan's pamphlet on the subject fell into my hands. I persued it with great pleasure but soon lost it, and though I have been in quest of it for above 40 years I never could get my eyes upon it till within these last few days, which makes me conclude that it is out of print. That so valuable a fragment may not be lost, I shall insert the principal parts of it in this appendix, and I hope it will render the book more extensively useful and at the same time tend to corroberate my statements concerning mothers.[35]

Buchan's *Advice to Mothers* is a most mature book. In it there is a chapter entitled "of children's dress" in which Buchan wrote:

> There is not any parts of my professional labours which I review with greater pleasure, than my exertions in early life to rescue infants from the cruel torture of swaddling, of rolling and of bandages. When I first ventured to take up the subject about half a century ago, it certainly required the ardour, courage and enthusiasm of youth to animate my opposition not only to the prevalence of customs and the stubbornness of old prejudices, but to the doctrines of the Faculty themselves.[36]

In this book, Buchan devoted many pages to the "tyranny of dress." He wrote:

> Women fancied that the shape, beauty and health of the infant depended wholly on the expertness of the person employed in dressing it. The midwife was to new-mould the head and to shape every limb according to her own fancy. . . . I have often been astonished at the insensibility of midwives and nurses to the cries of infants while dressing—cries that seldom ceased till the powers of the poor creatures were exhausted.[37]

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[35] W. Buchan: *Advice to Mothers . . .*, London, 1803, p. 377.
[36] *Ibid.*, p. 139. [37] *Ibid.*, p. 115.

Moss [38] described the method of swaddling infants but stated that it was unnecessary and hurtful. He did, however, allow a flannel roller about 4-6 inches wide to be rolled once or twice *moderately* tight about the body upon the navel, which is " very properly designed to support the navel to prevent a rupture to it." He went on to remark that " the number of pins used in the dress of a child is sometimes very great." [39] He suggested that instead of pins, tapes or strings should be used as in " the foundling dress, so-called from being first invented at the Foundling Hospital for the sake no doubt of convenience and dispatch." Cadogan's form of dress for

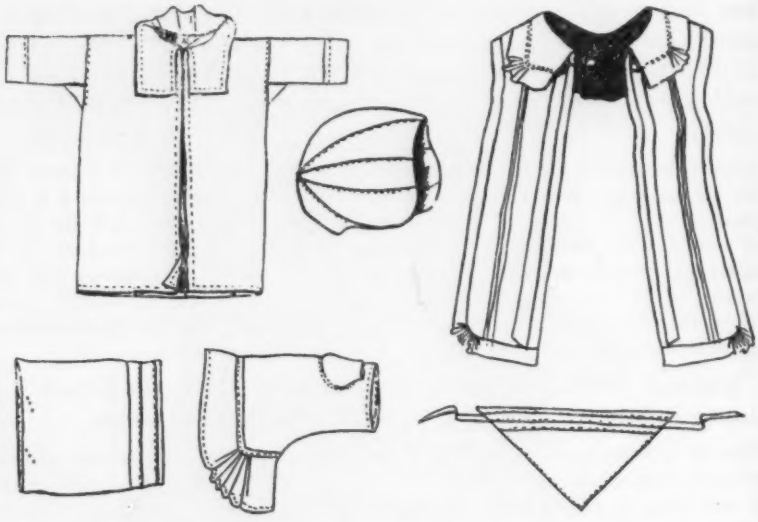

Fig. 3. Early 18th Century baby clothes. Note absence of buttons or tapes and position of pin holes (see cuff, bottom left).

(From The Victoria and Albert Museum by kind permission.)

infants, loose-fitting and secured by tapes, not pins, had evidently come into fashion. The insistence on tapes is of interest. I have studied many examples of late 17th and early 18th century babies' clothes in the Victoria and Albert Museum, and the lack of tapes and buttons is most striking. Often rust stains can be seen where pins have been, and on holding the garment to the light the perforations are visible. (Fig. 3) The pins must have been a real danger. Buchan [40] recounted the story of a child who

[38] W. Moss, *op. cit.*, p. 42. [39] *Ibid.*, p. 44. [40] *Domestic Medicine*, p. 10.

died of convulsions and, when eventually his swaddling clothes were removed, it was found that a long pin had penetrated several inches into the body.

Pins in the 18th century were straight wires with a head at one end. The *Oxford English Dictionary* states that safety pins were invented in 1857, but this apparently refers to a patent taken out for a pin with a large head which was " safe " only because it could not fall out. Brooches of the safety pin type (called *fibulae*) were in use from antiquity, but these would probably have been too costly for routine use on infants in the 18th century.

Underwood, whom Still called the " most advanced writer on diseases of children in the eighteenth century," [41] was entirely in favour of abandoning the tight swaddling of infants. He wrote in 1784, " For this advice we are perhaps greatly indebted to Dr. Cadogan. It is certain also that for the last 20 years the fashion recommended by him has been improving, but there is yet room to go forward." [42]

In 1797 Tytler published a translation from the Latin of de Sainte-Marthe's *Paedotrophia*, a poem in three books. As a literary effort the work leaves much to be desired, and as a serious contribution to the advancement of knowledge it was equally valueless, as the original was published about 1584. De Sainte-Marthe of course advised swaddling, but Tytler in a footnote stated that " swathing with tight bandages is now justly laid aside." [43] Struve [44] too wrote a book in 1797 on the management of infants. The book gave little space to the subject of how children should be dressed beyond stating that Rousseau very properly condemned all tight garments and swaddling clothes. Struve was probably quoting the book *Emile* which was published in 1762. This opens with a description of infant management. In it Rousseau condemned swaddling and thought that a baby should have " no cap, no bandages, no swaddling clothes. . . . Compare him (an infant so dressed) with a well swaddled child of the same age and you will be surprised at the different rates of progress." In a footnote appended to this last remark, Rousseau quoted Buffon, who described how Peruvian and negro children were allowed to be free and " begin to crawl at the age of 2 months." Rousseau continued, " M. Buffon might also have quoted the example of England

[41] G. F. Still: *The History of Paediatrics*. London: Oxford Univ. Pr., 1931, p. 476.
[42] M. Underwood: *A Treatise on the Diseases of Children*, with Directions for the Management of Infants from the Birth. London, 1784, p. 230.
[43] P. 67.
[44] C. A. Struve: *Neues Handbuch der Kinderkrankheiten* . . . Breslau: Hirschberg

where the senseless and barbarous swaddling clothes have become almost obsolete." [45]

It will be seen that Cadogan's views on dress, which seem to us eminently sensible, were slowly accepted during the 50 years after he wrote. Perhaps others had also condemned swaddling, but it happened that Cadogan was in the position to advance his views in the Foundling Hospital which at that time was very much in the public eye.

Fresh Air.

Associated with his dislike of tight clothing, was Cadogan's opinion that infants should have enough fresh air, and not be confined to the suffocating atmosphere of the lying-in room.[46] As usual he advocated moderation with the avoidance of extremes. This was very necessary. Pechey, in 1697, had warned his readers against the custom of dipping an infant "warm from the womb" into a cold brook, while Harris [47] considered that one of the four causes of disease in infants was their catching cold, especially from the evening air. Astruc [48] believed that the head was particularly vulnerable and wrote that it should be covered with a woollen cap immediately the vernix had been washed off. Bracken [49] thought that light as well as cold was injurious and that the newborn infant should be kept in the dark for several days. The author of *The Nurses Guide* gave instructions as to how impure air should be recognized: "expose the flesh or fat of a newly killed animal, if the air be impure the flesh will in a little time turn blackish and the fat yellowish."

Toward the end of the century some writers agreed with Cadogan that fresh air did not harm the infant,[50] while others, notably Armstrong [51] and Moss,[52] still thought that exposure to cold and fresh air was one of the greatest evils an infant could suffer. Moss's regime was as follows: the newborn infant was first wrapped in a piece of warm flannel called a receiver. Before he was dressed he was held "within the air of the

etc., 1797: *A Familiar Treatise on the Physical Education of Children . . .*, Translated by A. F. M. Willich. London: Murray and Highley, 1801, p. 86.

[45] J. J. Rousseau: *Emile.* Translated by Barbara Foxley, London: Dent, 1911, p. 28.

[46] *Op. cit.*, p. 9.

[47] W. Harris: *De morbis acutis infantum.* Amsterdam, 1689: *A Treatise of the Acute Diseases of Infants.* Translated by John Martyn. London: Ashley, 1742, pp. 14-15.

[48] *Op. cit.*

[49] H. Bracken: *The Midwife's Companion.* London: Clarke, 1737, p. 207.

[50] Nelson, *op. cit.*, p. 93; Tissot, *op. cit.*; Underwood, *op. cit.*; Buchan: *Advice to Mothers*, p. 115.

[51] *Op. cit.*, p. 172.

[52] *Op. cit.*, p. 38.

fire" for a quarter to half an hour (even in summer). Then he was carried into a warm room from which he was removed as seldom as possible for the first month of life. During this time he had to be warmly clad and changed in front of a fire. At the end of a month he could be moved, well wrapped up, into some other room in the house. By the end of the second month he was allowed into the open air in summer, but in winter "the risk must not be taken."

Before condemning the teaching of Moss and those like him as merely laughable, we must remember that he was writing before the advent of central heating, electric radiators, or even gas fires. The sole method of heating in winter was an open fire. The fuel was often only wood, as poor transport made coal very expensive. Rubber hot water bottles had not been invented, and warming pans could only be used to heat the bedding and then had to be removed. The danger to the newborn from cold has long been recognized. A hundred years later Henoch [53] gave an account of "oedema of the newborn" in which cold played a part.

Washing.

Partly no doubt because of the labour involved in removing a load of wrappings, babies were changed infrequently. Bracken [54] was one of those who thought that an infant should be kept as clean and sweet as possible. Cadogan, too, believed that a baby could not be changed too frequently, thereby freeing it from "stinkes and sourness." He disagreed with those who taught that changing and washing babies "robbed them of their nourishing juices." [55] He did not mention what temperature the water used for washing should be.

Brouzet [56] also believed in frequent washing, "at least once a day." Infants "should not be suffered to lie in their urine and excrements." They should be washed in warm water, although some used breast milk, spittle, or got the dog to lick them! Though warm water had its advocates, later writers, even those who were most afraid of fresh air, thought that a daily bath in cold water was better. Nelson [57] wrote, "The more

[53] E. Henoch: *Vorlesungen über Kinderkrankheiten.* Berlin: Hirschwald, 1887: *Lectures on Children's Diseases.* Translated by John Thomson. London: New Sydenham Soc., 1889, vol. 1, p. 53.

[54] *Loc. cit.*

[55] *Op. cit.*, p. 12.

[56] N. Brouzet: *Essai sur l'éducation médicinale des enfans, et sur leurs maladies.* Paris: Cavelier, 1754: *An Essay on the Medicinal Education of Children and the Treatment of Their Diseases,* 1755, p. 65.

[57] *Op. cit.*, p. 101.

water and the colder the better." Evidently cold water had come to be the fashion, not so much for its cleansing properties as for its therapeutic value. Elizabeth Ham [58] tells us in her autobiography that soon after birth she was taken out of doors by her father to be admired by a friend on horseback. " The consequence of this early exposure was an inflammation of the eyes which made it necessary to confine me to a dark room for the first year of my life. . . . For this weakness I was doomed to a daily immersion in a tub of cold water."

Michael Underwood,[59] who took every opportunity to tilt at George Armstrong (a cold water enthusiast), was one of the few writers in the latter part of the century to consider that the bath water should be warm.

Purging Meconium.

A brief which seems to have been almost universally held in the 18th as in previous centuries, was that the " first passages " should be cleansed as soon after birth as possible.—" For a certain black and pitchy matter is contracted in the womb and ought to be presently evacuated, for if it be not fits are occasioned." [60] In order to aid this evacuation all manner of foods or medicaments were forced down the newborn baby's throat. Pechey suggested honey or " Oyl of Almonds "; Ettmüller [61] a mixture of Syr. of roses, chicory with rhubarb and an emetic syrup; Boerhaave(?)[62] advised honey, manna or " spiritus fomentations applied to the belly "; Bracken [63] suggested black cherry water with a little sugar; Astruc " a small spoonful of sugared wine three times a day," or butter and honey.[64]

Cadogan described the custom of purging meconium in characteristic vein. He wrote, " The general practice is, as soon as the child is born, to cram a dab of butter and sugar down its throat, a little oil, panada, caudle or some such unwholesome mess." It was even " the custom of some to give a little roast pig to an infant." [65] But nature had ordained that nothing should be available immediately after birth until the mother's milk came in, and, therefore, he argued, a period of abstinence was best

[58] Elizabeth Ham: *Elizabeth Ham by Herself*, 1783-1820. Edited by Eric Gillett. London, Faber and Faber Ltd., 1945, p. 14.
[59] *Op. cit.*, p. 220.
[60] Pechey, *op. cit.*, p. 4.
[61] M. Ettmüller: *Ettmüllerus Abridged.* . . . Translated from the edition of the works of Michael Ettmüller. 2nd ed., London: Bell, 1703, p. 620.
[62] Quoted in, Anon: *A Full View of All the Diseases Incident to Children.* London. 1742, p. 120.
[63] *Op. cit.*
[64] *Op. cit.*, p. 16.
[65] *Op. cit.*, p. 13.

for the baby. In due course the baby should be allowed to suck from his mother, and Cadogan believed, like many others, that colostrum was purgative.

Brouzet, Tissot, and Rosén von Rosenstein [66]—none of them English, be it noted—had evidently not heard of Cadogan's views and, although writing after Cadogan, still advised wine, sugar, or honey. But Theobald [67] quoted Cadogan's words, although he did not in this passage mention his name. Moss,[68] too, remarked that butter and sugar, " a very nauseous mixture," was often given to the newborn, but he did not quite have the courage to advise that nothing be given until the mother's milk came in, for instead he advised a " little brown sugar dissolved in water and given gradually in a teaspoon."

Underwood,[69] who quoted Cadogan with disapproval elsewhere, belonged to the school of those who believed that the meconium must be purged. If rhubarb was not sufficient, a " clyster " (enema) should be " thrown up," and, if still nothing happened, violent means were required. To one infant he had given senna, rochelle salts, jalap, calomel, and castor oil, all in relatively big doses.

The importance of Cadogan's observations lay not only in his suggestion that such concoctions as butter, sugar, caudle etc. were harmful to the newborn baby, but also in his advice that not even breast milk should be given for a while. He wrote, " When a child is first born there seems to be no provision at all made for it; for the mother's milk seldom comes 'till the third day; so that, according to Nature a child should be left a day and a half or 2 days without any food; to me, a very sufficient proof that it wants none." He continued, " it requires this intermediate time of abstinence and rest to compose and recover the struggle of the birth and the change of circulation. . . . However extraordinary this may appear, I am sure it is better it were not fed at all, for it sleeps almost the whole time, and when the milk is ready for it, would be hungry and suck with more eagerness." [70]

Whether Cadogan intended every child to wait many hours is not certain. Probably not. Nelson [71] discussed the subject of when a child should be put to the breast. He wrote, " Though I could say a good deal from my own observation, I have endeavoured to settle it (the question)

[66] N. Rosén von Rosenstein: *Underrättelser om barnsjukdomar och deras botemedel.* Stockholm: Kongl. Wet. Acad., 1764: *The Diseases of Children and Their Remedies.* Translated, from 1771 Swedish ed., by A. Sparrmann. London, 1776, p. 120.

[67] *Op. cit.*, p. 2.

[68] *Op. cit.*, p. 39.

[69] *Op. cit.*, p. 23.

[70] *Op. cit.*, p. 13.

[71] *Op. cit.*, p. 47.

upon a much stronger basis. viz. the experience of competent judges." He then said that he had been informed by Mr. Hunter, well-known to the public by his lectures in Anatomy, and one of the man-midwives of the lying-in Hospital in Brownlow Street, " that at first they tried waiting till milk flowed from the mother, but this resulted in sore breasts and milk fever." They then tried putting the child to the breast within a few hours of delivery, which was found to be much more satisfactory. Nelson continued, " This method of putting children to the breast much sooner than usual, corresponds with the opinion of Dr. Cadogan, who in a small pamphlet on the management of children has said a great many sensible useful things." (It is perhaps pertinent to note that both Cadogan and William Hunter's name are given in the list of 500 subscribers to the book. Hunter gave 5 guineas). Nelson sugggested that a child should be put to the breast 7-8 hours after birth.

Cadogan was not the first to suggest that the infant should wait a few hours before being put to the breast. Astruc [72] said that the baby should be kept from the breast 12-24 hours, but he allowed wine or even butter and honey during the period of waiting. Rosén von Rosenstein [73] thought it unnecessary to put the child to the breast during the first 24 hours but he allowed the baby to suck from a piece of muslin containing manna or sugar. Cadogan remained for many years lonely in his insistence that *nothing* was required during the first few hours after birth.

Infant Feeding.

The history of infant feeding is a subject about which much has been written, especially by Drake [74] and Wickes.[75] Three methods of feeding have been used in the past, breast feeding by the mother, breast feeding by a wet nurse, or artificial feeding.

In the past, when a mother did not suckle her young, wet nurses were usually employed. In the Greek and Roman era, slaves were used for this purpose, and it soon became established that well-to-do women did not feed their young. In later centuries this custom spread down the social scale. Thus we find that Shakespeare wrote of the " infant, mewling and puking in the *nurse's* arms." [76] By the eighteenth century wet nurses were

[72] *Op. cit.*, p. 14. [73] *Op. cit.*, p. 14.

[74] T. G. H. Drake: " Infant feeding in England and France from 1750-1800." *Am. J. Dis. Child.*, 1930, *39*: 1049; " Pap and panada." *Ann. M. Hist.*, 1931, *n. s. 3*: 289; " The wet nurse in France in the 18th century." *Bull. Hist. Med.*, 1940, *8*: 934; " Antique British silver of medical interest." *J. Hist. Med. and Allied Sc.*, 1952, *7*: 68.

[75] I. G. Wickes: " A history of infant feeding." *Arch. Dis. Childhood*, 1953, *28*: 232, 332.

[76] *As You Like It*, Act II, scene 8.

employed even by the poor, grim economic necessity driving the mothers back to work. At that time it was estimated that only 3 per cent of children in towns were nursed by their mothers.[77] In France, the traffic in nurses was so great that it was regulated by law, and nurses from the country assembled in special houses in Paris to be hired.[78]

Wet nurses in Britain were supplied by lying-in hospitals or by accoucheurs, each of whom kept his "nurse-book." Hiring was usually arranged by the quarter or by the year. Nurses were paid ten guineas for one quarter, sixteen for two, and twenty-five for a year. If the nurse had to provide her own tea and sugar she expected two guineas a year extra.[79]

In 1689, Harris threw some interesting light on the problem. Wealthy mothers he wrote, would not feed their children because employing a wet nurse allowed them more time for adorning their persons and for "frequent attendance in theatres and spending the greater part of the night on their beloved cards." The nurses he said were "greedy only for the profane rewards bestowed on them at the christening, and slight the small weekly income that follows." He was told with great grief of mind by the Rector of a parish twelve miles from London, that when he first came to the parish it was filled with suckling infants, and yet in the space of one year he had buried them all except two. The same number of infants were "soon twice supplied, according to the usual custom of hireling nurses, from the very great and almost inexhaustible city," but "he had committed them all to their parent earth, in the very same year." [80]

Many regarded giving the child into the hands of a wet nurse as a convenient form of infanticide. Being "overlaid and starved at nurse" is stated to have caused the death of 529 children in the London Bills of Mortality for 20 years ending 1659.[81] This is certainly a conservative statement; "without the least doubt" wrote Jonas Hanway, one of the Governors of the Foundling Hospital, "there have been nurses in times past who were denominated 'killing nurses,' as well they might, if no child ever came out of their hands alive." [82]

[77] C. Mettler: *History of Medicine.* Philadelphia: Blakiston, 1947, p. 728.

[78] Drake: "The wet nurse in France. . . ." *See* especially, fig. 6: "Wet nursing bureau, Paris, 1800."

[79] D. Forsyth: "The history of infant feeding from Elizabethan times." *Proc. Roy. Soc. Med.*, 1911, *4*: pt. 1: 110.

[80] *Op. cit.*, p. 17.

[81] Graunt, *op. cit.*

[82] J. Hanway: Ernest Appeal for Mercy to the Children of the Poor. London, 1766. Cited by R. H. Nichols and F. A. Wray: *The History of the Founding Hospital.* London: Ox. Univ. Pr., 1935, p. 60.

Prior to the middle of the 18th century the main argument used against wet-nursing was that the child might imbibe the nurse's mental and moral characteristics along with her milk. Defoe, in his book *The Compleat English Gentleman,* gives a long digression on this subject. He quoted Queen Anne, wife of King James I, who suckled her own children with pleasure, as saying: "Will I let my child, the child of a king, suck the milk of a subject and mingle the royal blood with the blood of a servant?" Defoe considered it very wrong when, to gratify their own pride and pleasure, the mothers of gentlemen allowed

> the heir to drink the blood of a slave or drudge, the blood of a clown or a boor . . . they scorn to marry 'em among citizens or tradesmen however personally accomplished, however furnished with wit, beauty, modesty, breeding or fortune, but let them suck in the life blood of a dairy wench or a wool comber, nay of a cook maid of the family married perhaps to a carter or other slave. . . . Nor do these ladies trouble themselves to enquire into the temper of the woman, little knowing that her son shall drink in the passions, the temper, nay indeed the very soul of the woman whose milk he sucks, not to speak of her bodily infirmities.[83]

The anonymous author of *The Nurses Guide* explained that milk was nearly the same as blood, but that it was "necessary that its red colour should be changed to white to prevent that dread and horror which every nurse would otherwise have at the sight as often as she gave suck." [84] He also considered that the nurse's disposition was communicated to the child and said that Caligula's drunknness and Tiberius's cruelty came from their nurses. This argument was rejected however by Bracken who considered that "the milk of the mother is no more to the child than the earth to a plant." [85]

Cadogan did not give arguments against wet-nursing but instead, in a delightful passage, urged the pleasures of maternal breast-feeding. He wrote:

> were it rightly arranged, there would be much pleasure in it, to every woman that can prevail upon herself to give up a little of the beauty of her breast to feed her offspring; though this is a mistaken notion, for the breasts are not spoiled by giving suck, but by growing fat. There would be no fear of offending the husband's ears with the noise of the squalling Brat. The child, were it nursed this way, would be always quiet and in good humour, ever playing, laughing or sleeping. In my opinion, a man of sense cannot have a prettier Rattle (for rattles he must have of one kind or another) than such a young child.[86]

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[83] D. Defoe: *The Compleat English Gentleman,* c. 1728. Edited by Karl D. Bülbring. London, 1890, p. 7.

[84] P. 16. [85] *Op. cit.,* p. 274. [86] *Op. cit.,* p. 24.

Even after the middle of the century some writers only paid lip service to maternal breast-feeding.[87] By 1784, however, Underwood was able to write on the subject: " it is no small satisfaction to me to declare that in this country there is no ground for a general complaint on this head." [88] In 1791, B. Lara even wrote a book entitled: *An Essay on the Injurious Custom of Mothers not Suckling Their Own Children.*

Cadogan, of course, realised that however desirable it might be for mothers to breast feed their young, it was quite impossible in the peculiar circumstances of the Foundling Hospital where he worked. Wet-nursing had therefore to be employed, but if possible this was to be in the country under the supervision of inspectors. For this reason he gave careful instructions as to how the nurses should be chosen—clean and healthy women between the ages of 20 and 30 who had had a child of their own within the previous 2 or 3 months.[89] This is an advance on the advice given in the *Nurses Guide* [90] in which it is stated, amongst other injunctions, that the nurse must not squint or else the child would continue the same evil habit. The same writer also advocated the famous nail test first described by Soranus, 1,600 years before.[91] Brouzet, with French fastidiousness, gave some additional advice for choosing a wet nurse. He suggested that her breasts must be " in the form of a pear " and that she should have no " rank smell under the armpits." [92]

Many writers including Cadogan gave careful directions with regard to the diet which a wet nurse should take. In the main this took the form of a prohibition of alcohol, especially wine, gin, and brandy, although Cadogan permitted " small beer," and the author of the *Nurses Guide* devoted three pages [93] to the praise of malt drinks as a lactagogue. With regard to food, Cadogan advised that the nurse should have one good meat meal a day and adequate vegetables and bread.

Artificial Feeding.

The frequency with which artificial feeding was employed in the past is much disputed. It is sometimes thought that breast-feeding by the mother or nurse was almost universal, but as Wickes [94] pointed out, infant feeding bottles have been found dating from Roman times, and mediaeval prints survive depicting the use of a cow's horn as a feeding bottle. Two main reasons used to be advanced against artificial feeding. Firstly, it was

[87] E. g. Nelson, Brouzet.
[88] *Op. cit.*, p. 218.
[89] *Op. cit.*, p. 26.
[90] P. 28.
[91] Still, *op. cit.*, p. 29.
[92] *Op. cit.*, p. 98.
[93] Pp. 34-37.
[94] *Loc. cit.*

maintained that the infant would develop the mental characteristics of the creature whose milk it sucked; the second, more cogent, reason, was the deplorably high death rate which followed the hand feeding of infants.

Usually the alternative to breast milk was cows' milk, but sometimes goats' milk or asses' milk was used. It is little wonder that artificially fed babies fared so badly when we consider the state of the milk supplied to large cities in the eighteenth century. A small part came from farms in the vicinity of the town, but much of this must have been nearly sour by the time it was retailed. The rest was provided by cows kept in filthy conditions in the towns themselves.[95] Even in 1847, West, in an annotation in the *Lancet,* mentioned the unhealthiness of the milk derived from stall-fed cows "kept in the dens and cellars of some of the wretched districts in London."[96] Milk was often bought direct from the udder to ensure that it was not watered, the cows being driven round the streets.

In addition to the poor quality of the milk, the method of giving it left much to be desired. Rubber teats were, of course, unknown, and a common alternative was for the baby to suck a sponge stuck in the neck of a feeding bottle.

Baldini, who described a special bottle he had invented, suggested that the bottle and sponge should be washed several times a day in lukewarm water.[97] Even if this injunction had been scrupulously followed, which is improbable, the sponge must soon have become foul and a ready breeding place for bacteria.

Some unfortunate children were not even given milk. Brouzet quoted a method of feeding infants invented by Van Helmont—"a great physician." The infants were given "a kind of panada made of bread, slightly boiled in small beer and sweetened with clarified honey or sugar, the whole being reduced to the consistence of a jelly, and at length diluting it with a sufficient quantity of small beer to . . . serve as a drink."[98] After three pages of discussion Brouzet decided that this diet should first be tried experimentally on the inmates of a Foundling Hospital. One complication of this type of feeding noted by the author of the *Nurses Guide* and by Armstrong[99] was that the child passed a great deal of urine. Obviously

[95] J. C. Drummond and A. Wilbraham: *The Englishman's Food.* London: Cape, 1940, p. 230.
[96] C. (?) West: Report on "Diet in infancy," *Lancet,* 1847, *2*: 180.
[97] Drake: "Infant feeding in England. . . ."
[98] *Op. cit.,* p. 76.
[99] *Op. cit.,* p. 153.

children fed this way could hardly avoid scurvy and other vitamin deficiency diseases. It is small wonder that Cadogan dismissed "dry-nursing" with the words, "I look upon this to be the most unnatural and dangerous method of all, and according to my observation not one in three survive it." [100]

Breast Feeding.

One of the ways in which Cadogan demonstrated his superiority over his contemporaries was by his insistance on the sufficiency of breast milk. "If I could prevail, no child should ever be . . . fed with any ungenial alien diet whatever, the *first three months;* for it is not well able to digest and assimilate other aliments sooner." Some previous writers [101] had also suggested that breast milk was adequate alone, but not with the same vehemence. Astruc [102] considered that the infant should not be glutted with pap in the first months, but he allowed that it should be given twice a day. Brouzet [103] gave a long discussion on the pros and cons of giving panada with breast milk but made no confident recommendation. Many later writers,[104] especially those who had been influenced by Cadogan, considered that breast milk alone was sufficient, but, rather unexpectedly, Underwood [105] taught that pap was allowable with breast milk.

Not surprisingly, dietary upsets were common in the 18th and previous centuries. The reason for this is not far to seek. Ettmüller described nurses taking pap into their own mouths to dilute it with saliva before giving it to the infant, and even Cadogan advised giving unboiled cows' milk. Infection was rampant, but as this was not recognised, the puking and diarrhoea was put down to overfeeding. For this reason Cadogan, in company with many others,[106] firmly believed that children should not be fed too frequently. Instead of feeding the infant every time he cried as was often done, sometimes amounting to ten, twelve, or more feeds in the day or night, Cadogan considered that the child should be attended to, and he should be fed, four times in the twenty-four hours,

[100] *Op. cit.*, p. 25.
[101] E. g. Pechey, *op. cit.*, p. 7; *Nurses Guide*, p. 53; Conyers, *op. cit.*, p. 12.
[102] *Op. cit.*, p. 20.
[103] *Op. cit.*, p. 98.
[104] Buchan: *Domestic Medicine*, p. 10, *Advice to Mothers*, p. 209; Smith, *op. cit.*, p. 83; Armstrong, *op. cit.*, p. 153; Struve: *A Familiar Treatise* etc., p. 103.
[105] *Op. cit.*, p. 244.
[106] Brouzet, *op. cit.*, p. 69; Theobald, *op. cit.*, p. 2; Tissot, *op. cit.*, p. 400; Smith, *op. cit.*, pp. 93, 123; Rosén von Rosenstein, *op. cit.*; Moss, *op. cit.*, p. 112; Underwood, *op. cit.*; Struve: *A Familiar Treatise* etc., p. 103.

from both breasts each feed, allowing him to take as much as he required.[107] He suggested that after three months the child should only be fed twice or three times a day. Children fed this way were healthy, active, and happy, and made their needs of food known by a hundred signals " which are intelligible as if they had been spoke." [108]

Weaning.

The age at which weaning should be commenced has varied greatly from country to country and from century to century. It is often difficult to be certain at what time weaning did occur, as, although most paediatric textbooks give a date, it is apparent that the process was usually gradual and that some additions were made to the diet even when the child was still on the breast. Cadogan suggested that nature intended children to suck for a year, as at about that age, teeth appear. He gave, as an additional reason, that at around twelve months, " women in general, though they give suck, are apt to breed again; some indeed that are very sanguine will breed sooner." [109] Solids were to be introduced, " not all at once but by insensible degrees." [110] Other writers during the 18th century suggested dates for weaning ranging from seven [111] to twenty-four months.[112] Later authors suggested that solids should be given earlier. For instance, Buchan stressed that weaning should be gradual and advocated introducing some supplements by the third or fourth month.[113]

Although the age at which weaning commenced may have varied, the types of food introduced differed little. Almost universally a farinaceous diet was given at first. In Britain, as on the continent, pap and panada were for hundreds of years the main fare. Panada was a most ancient prescription and had been used from the times of Galen. Pap dates from about 1465. Details of how pap would be made were given by many writers. The following description by Bonet in 1684, can be taken as representative:

> Take barley or oatin-flour, put it in a bag of thick cloth, boil it in a kettle for twelve hours so that the water may be always above it, keeping down the bag by laying a weight upon it. When the flour is taken out, set it in a hot oven after the bread is taken out, and keep the mass for use.[114]

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[107] *Op. cit.*, p. 25.
[108] *Ibid.*, p. 17.
[109] *Ibid.*, p. 27.
[110] *Ibid.*, p. 21.
[111] *Nurses Guide*, p. 41.
[112] Astruc, *op. cit.*, p. 20.
[113] *Advice to Mothers*, p. 209.
[114] T. Bonet: *Guide to the Practical Physician.* London: Flesher, 1684, p. 323.

When required to feed the baby this " mass " was mixed with water or milk. It is little wonder that Conyers warned against pap. But few writers agreed with him. The anonymous author of the *Nurses Guide* for instance, considered that pap should be the only addition to milk in the diet until all the teeth were through. Panada was a preparation of various flours, cereals, or bread, with butter or milk, which was usually cooked in broth.

The frequency with which pap and panada was given can be gauged from the number of pap boats still in existence. Drake was able to write in 1952: " the pap boat occupied in the past the position of christening gift to the infant from the god-parent, relatives or friends, now held by the silver mug or porringer. The extent of one's collection of pap feeders of the ordinary boat-shape depends only upon one's pocketbook and enthusiasm, practically every antique dealer having one or more examples in stock." Since 1952 the stock in Great Britain seems to have run out.

With regard to other articles of diet, there was some difference of opinion over the advisability of giving meat when weaning. Some writers like Locke would not permit it until the child was two to three years old.[115] Others allowed it earlier. Pechey suggested that it should first be chewed by the nurse until the child had sufficient teeth to be able to chew itself.[116] Fruit and vegetables were rarely mentioned.

Cadogan believed that food should be simple and light. For this reason he would not wean children on to " paps, panada, gruel, etc." which were " generally enriched with sugar, spice and sometimes a drop of wine." [117] He considered also that such foods as " unfermented flour and eggs boiled hard " were too heavy. Instead he suggested that from the age of three months children should be given good bread in cows' milk once a day, and thin meat broth with bread or rice in it once a day. The quantity offered was to be as much as the baby would take. At six months the same diet could be given three times a day,[118] and at six to eight months when children developed teeth " they may by degrees be used to a little flesh-meat." [119] Children in the Foundling Hospital, who were wet-nursed, had to be weaned earlier and more rapidly, presumably because the nurse was feeding two children, her own and the hospital baby. These children, therefore, were allowed a little bread and butter—provided the butter was sweet and fresh, not rancid. They were also given " any kind of mellow fruit, either raw, stewed or baked; roots of all sorts and

[115] J. Locke: *Some Thought Concerning Education.* London, 1690, 11th ed., 1745, p. 14.
[116] *Op. cit.*, p. 8.
[117] *Op. cit.*, p. 17.
[118] *Ibid.*, p. 20.
[119] *Ibid.*, p. 31.

all the produce of the kitchen garden." Cadogan did not subscribe to the " idle notion of such things being windy " or being particularly liable to breed worms.[120]

Cadogan's reasons for advising the diet outlined above were often false. He believed for instance that vegetable preparations were acid, whereas flesh tended toward putrefaction. But whatever the motive, the result was a balanced diet containing adequate calories, first class protein in the form of meat, but surprisingly, not eggs, iron from meat and vegetables, and vitamin C from unboiled cows' milk, fruit, and vegetables. Barring the accident of infection, infants under Cadogan's care would have thrived. The one great lack was Vitamin D. Cod liver oil was unknown, and fresh fish could only be obtained by those fortunates who lived near rivers or the coast.

Those who wrote immediately after Cadogan, or who do not seem to have heard of him, continued to feed babies initially on farinaceous food and later on meat. Smith's diet sheet in 1767 for a year-old baby still receiving some breast milk was as follows:

> Breakfast 6.0—7.0 a. m. ½ pint of new milk with 2 ozs. of bread in it.
> 2nd meal 10.0—11.0 a. m. ½ pint of meat broth with 2 ozs. bread.
> 3rd meal 2.0—3.0 p. m. —ditto—
> Supper 6.0 p. m. as breakfast.
> Barley water to be given between meals if the child was thirsty.

Theobald [121] and Buchan [122] echoed Cadogan's words and Underwood,[123] although not acknowledging his authority also advocated Cadogan's diet. Armstrong [124] and Lara [125] however, both returned to pap and panada as, rather surprisingly, did Clarke in 1815.[126] One of the most modern sounding diets was given by Struve [127] who suggested feeding 6 months old babies on broth, vegetables, and fruit, later adding meat and dishes prepared from flour and potatoes in moderation.

Sleep.

Persuading an infant to sleep was in the past an important part of a nurse's task. It was probably even harder than it is today as many

[120] *Ibid.*, p. 30.
[121] *Op. cit.*, p. 13.
[122] *Domestic Medicine*, p. 48.
[123] *Op. cit.*, p. 253.
[124] *Op. cit.*, p. 20.
[125] B. Lara: *An Essay on the Injurious Custom of Mothers not Suckling Their Own Children.* London, 1791, p. 43.
[126] *Op. cit.*, p. 56.
[127] *Op. cit.*, p. 103.

infants must have suffered from colic, infantile scurvy, respiratory infections, and other illnesses. The two recognized methods were rocking the cot and singing to the baby; both have been employed from time immemorial. Tytler [128] in a footnote to de Sainte-Marthe's *Paedotrophia,* went so far as to say that of two nurses equally qualified, she who can sing better should be preferred. Pechey wrote, " if watchings are troublesome sleep must be endeavoured by singing, rocking and offering the teat often." [129] Brouzet devoted four pages of his book to instructions on how to rock a cradle and the type of song to sing.[130] Cadogan however did not subscribe to this. He believed that the child should be kept awake and amused as much as possible by day and thus he would sleep well at night. Smith [131] and Struve both agreed with this viewpoint.

But another method of inducing sleep was also practiced. This was the use of drugs. Brouzet wrote that in France opium was commonly used by nurses,[132] and in Britain the custom of giving gin or other alcoholic drinks to babies was so universal that in 1740 the governors of the Foundling Hospital wrote a note to the College of Physicians to ask if it should be encouraged in the Hospital.

Walking.

When children were older Cadogan advocated " putting them soon upon their legs in order to favour their walking." [133] He wrote no more on the subject than this, but one feels that he would not have agreed with the writer of the *Nurses Guide* [134] who thought that the infant should not walk alone unless the nurse supported him with leading strings, or alternatively he should " be shut up in a little go-cart or go-wain which will roll him on as he goes without any danger of falling. . . . As soon as he begins to go alone without help 'tis necessary that someone should be always near him to take care that he does not fall, and if he does to take him up." This solicitude can be contrasted with Rousseau's remark 30 years later:

> Is there anything more foolish than the pains we take to teach a child to walk? . . . Emile will have no pads or go-carts or leading -strings. Instead of being cooped up in a stuffy room he will be taken out to the fields every day. There he will run and gambol and tumble a hundred times a day. The oftener he falls the better. He will soon learn to pick himself up. The blessedness of freedom makes up for many bruises.

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[128] *Op. cit.*, p. 95.
[129] *Op. cit.*, p. 5.
[130] *Op. cit.*, p. 65.
[131] *Op. cit.*, p. 93.
[132] *Op. cit.*, p. 58.
[133] *Op. cit.*, p. 33.
[134] P. 51.

Treatment.

In the 18th century, pukes, purges, and bleeding were the stock-in-trade of the children's physician. Much of the treatment must have been valueless, and some dangerous: for costiveness, Ettmüller[185] wrote, "we ordered 'em mouse dung dissolved in milk." Buchan, writing in 1803, tells us, "About 40 years ago when I undertook the charge of a large branch of the Foundling Hospital at Ackworth in Yorkshire, I found that the children at nurse had till then been attended by the country apothecaries who, sure of being paid for their drugs, always took care to exhibit them with a liberal hand." The cupboards were filled with phials and gallipots, and half the children died. Buchan suggested to the governors that no drugs should be given, the drug bill dropped, and the death rate fell to 1 in 50. But the way of the reformer is hard. On January 9, 1760, the treasurer at Ackworth, Sir Rowland Winn, wrote to Taylor White, Treasurer of the Hospital in London, concerning the low infant mortality rate,

> . . . but I really cannot so much commend Mr. Bacon's care of them. Though I know of some fine lady that finds great fault and pretends to say he neglects the children and does not give them sufficient quantity of medicine (as her Apothecary tells her), and therefore wants to employ her friend who, I am certain would give them more than Mr. Bacon does, for he is desirous of seeing what nature will do—but *this Entre Nous.*[186]

Conclusion.

All things considered, it is not surprising that the infant mortality rate in the 18th century was around 50 per cent. Ignorance, in the past, has killed more children than disease.

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[185] *Op. cit.*, p. 624.

[186] Ackworth Committee Minutes, 1759-1760. Buchan was the resident Apothecary at the time, and no other reference to "Mr. Bacon" can be found in the Ackworth papers. From the tone of the letter it is probable the mistake in name was not accidental.

THE *ACCUMULATIONES RECEPTARUM* OF JOANNES PISCIS

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The Faculty of Medicine at the University of Montpellier has a long and illustrious history. From its early beginnings in the middle of the twelfth century to the end of the fourteenth it held an enviable position among the Universities of Europe, and through the eminence of such celebrated masters as Arnold of Villanova, Petrus Hispanus, Richard of Wendover, and John of Tornamira it attracted to its halls throngs of students from every corner of Christendom. Its reputation as a centre for the teaching of medicine was for long supreme, but in the fifteenth century, for reasons which it is not difficult to fathom, a decline set in from which it never fully recovered. At the beginning of this period it could still count among its members teachers of undeniable merit, such as Valescus of Taranta and Jean de Piscis (or Pisis), but as time progressed the focus of attention shifted elsewhere, and Montpellier suffered a partial eclipse.

A study of one of the writings of Joannes Pisis, who was not only a master in medicine but also chancellor of the University of Montpellier from 1394 until his death in 1433, may throw some light, perhaps, on the causes of this decline.[1] John, who was a cleric attached to the diocese of Vienne and a master of arts of Paris University, has left little trace of his personal life,[2] but his association with Jean Gerson, chancellor of the University of Paris,[3] may indicate that his interests were not exclusively medical. His reputation hangs mainly on his writings, two of which have been published, namely, *Abregé du Tresor des poures*[4] and *Regimen pestilencie*.[5] Another work preserved in the Bibliothèque Nationale, *Certaynes curez et regimens d'Aucunez particulières et Aucunez prop-*

[1] E. Wickersheimer: *Dictionnaire biographique des médecins en France au moyen âge.* Paris: Droz, 1936, p. 464; M. Fournier: *Les statuts et privilèges des universités françaises.* Paris: Larose et Forcel, 1890-94, 1068, 1107; H. Denifle: *Les universités françaises au moyen âge.* Paris: Bouillon, 1892, p. 79; P. Pansier: "Les maitres de la faculté de médecine de Montpellier an moyen âge." *Janus,* 1905, *10*: 67, 117.

[2] He should be distinguished from another Jean de Pisis, or Piscis, or Paris, who in 1411 was refused his licentiate of medicine because he was married: he was granted it only on the death of his wife in 1418.

[3] *Opera Gersonii.* Ed. Ellies-Dupin, Antwerp, 1706, vol. III, c. 758.

[4] "Avec la cirurgie et plusieurs autres praticques nouvelles selon maistre Arnoul de Ville Nove et maistre Girard de Solo." Published at Paris 1512: there was another edition in 1517.

[5] Published by Sudhoff, *Archiv für Geschichte der Medizin,* 1925, *17*: 51-3.

rietez de certainez viandes,[6] awaits an editor. But apart from these, two other writings from his pen are known to bibliographers, a *Tractatus de febribus*[7] and a *Practica*, the latter of which was formerly in the library of the College of Mende[8] at Montpellier: both of these works have disappeared without trace. But at Wolfenbüttel there is a fragment of an *Antidotarium*[9] which may possibly be identified with a volume entitled *Accumulationes receptarum* the only known copy of which has come to light in the Wellcome Library. It is probable that there never were many copies of this work extant even during John's lifetime, and the fact that in the eighteenth century it was prized as a bibliographical rarity may be deduced from its having been acquired by that eminent bibliophile, Debure.[10] By him it was given as a token of respect to Nicholas Andry,[11] then dean of the Medical Faculty of Paris, and from him it passed into the Barrois collection. When this collection was bought *en bloc* by Bertram, 4th earl of Ashburnham, the manuscript came to England, was sold by the fifth earl at Sotheby's in 1901 and was eventually acquired by Sir Henry Wellcome for his library in 1909.

The manuscript was evidently written in the first place for some person

[6] B. N. ms. fr. 19994 and B. N. nouvelles acqu. fr. 11694.

[7] In 1765 Pelissier, *Apollinis Monspelliensis bibliotheca*, said: "restat solum modo ex omnibus Johannis de Piscis operibus ejus tractatus de febribus."

[8] *Cartulaire de l'Université de Montpellier*, II, p. cxxi: Pansier says there was a copy at the end of the sixteenth century in the library of the college of Urban V: he thinks that the two manuscripts in the Bibliothèque Nationale, (see note 6) are fragments of *Practica* translated into French.

[9] Ms. 2207 (18. 1. Aug. fol.).

[10] Guillaume-François Debure, b. 1731, d. 15 Jan. 1782. At the age of 24 he published his *Museum typographicum* and eight years later the first volume of his *Bibliographie instructive ou traité de la connaissance des livres rares et singuliers*, the seventh and last tome of which appeared in 1768. At that time it was a complete innovation, but now, though obviously outmoded, it can be consulted with profit. Debure was entrusted with selling some of the finest libraries of the eighteenth century.

[11] Andry was a merchant's son from Lyons, b. 1658. After completing his studies at Lyons, he came to Paris, followed courses in philosophy and theology and took his master's degree in 1685. In a note added to the ninth letter printed in 1737 during the polemic between the surgeons and physicians, he was said to have been professor of languages at the Collège des Crassins until he reached the age of fifty, when he began to take up medicine. But actually he was studying medicine in 1690, when he was 32; three years later he was a doctor at Rheims and left this position to join the Royal Chamber at Paris, where physicians who were not members of the Faculty of Medicine could practise. After the suppression of the Chamber in 1694, he took his degree of bachelor of Medicine and four years later that of Doctor. By 1701 he was Professor at the Royal College, then Royal Censor of Books in 1702, and finally Dean of the Medical Faculty in 1724. He wrote a great number of books and died about 1742. He seems to have been a very lively person with a caustic wit.

in high station. It is a folio volume on vellum written in large characters known as bâtardes. It is liberally decorated with red and blue in the margins, and all the initials and paragraph headings are coloured in the same way. Whether this is the book "qui estoit de feu maistre Jehan Pissis" which Delisle said was copied by Jehan Chabault, notary of Valence, at the instance of Louis XI in 1482,[12] is not certain; but there can be no argument about the princely scale on which the book has been prepared. Unfortunately, the same care has not been extended to the spelling of the text and the latin is not always accurate: it passes, for instance, from genitive to accusative without demur; it puts nominative and accusative side by side; the singulars and plurals seem to have got confused, certain words and phrases are repeated, and punctuation is almost non-existent. But these are mere literary blemishes which do not impair the value of the purely medical element in the book. It may be that the scribe understood little of what he was copying; he may have based his text on an imperfect version, but there is always the chance that the original text itself, being a compilation, was not wholly free from errors in the first place.

The treatise contains sixty-six chapters, the titles of which run as follows:

1. Febris. 2. Febris effemera. 3. Febris terciana. 4. Febris quotidiana. 5. Febris quartana. 6. Febris pestilentialis. 7. Febris acuta. 8. Febris composita. 9. De venenis. 10. De dolore. 11. De apostematibus. 12. De apostematibus intrinsecis. 13. De impetigine et serpigine. 14. De allopecia. 15. De lepra leonina. 16. De morpheis. 17. De scrophulis. 18. De vulneribus. 19. De fluxu sanguinis. 20. De dolore capitis. 21. De sompno. 22. De epilensia. 23. De appoplexia. 24. De vertigine. 25. De mania et melencolia. 26. De litargia. 27. De conservacione memorie. 28. De casu capillorum. 29. De dolore occulorum. 30. De macula rubea in oculo. 31. De passionibus uvule. 32. De surditate. 33. De egritudinibus oris. 34. De dolore dencium. 35. De passionibus lingue. 36. De loquela amissa. 37. De gutture corrupto. 38. De squinancia. 39. De siti. 40. De fluxu salive. 41. De mala complexione epatis. 42. De tremore cordis. 43. De apostemate stomachi. 44. De appetitu. 45. De vomitu. 46. De mala complexione epatis. (see 41). 47. De passionibus splenis. 48. De passione mamillarum. 49. De omni dolore matricis. 50. De sterelitate. 51. De paucitate cohitus. 52. De fluxu spermatis. 53. De dolore virge. 54. De fluxu albo. 55. De fluxu ventris. 56. De collica passione. 57. De

[12] L. Delisle, *Le cabinet des manuscrits*. Paris: *Imprimerie Impériale*, 1868, I, p. 75.

emissione ventositatis. 58. De medicina evacuativa. 59. De dolore renum. 60. De emoroide. 61. De rasura intestinorum. 62. De ydropisi. 63. De paralesi. 64. De pleurisi. 65. De guctosis. 66. De infantibus.

It will be noticed that the work does not seem to end on a conclusive note, but merely dies out like a desultory conversation. Whether or not this was characteristic of the primitive text is not clear; but an indication that, perhaps, there was more to come is provided by the blank pages at the end which are scored and lined ready for more script. Furthermore, there is no colophon and no *explicit*, nor any remark made in the final chapter which might lead one to suspect that the writer was bringing his compilation to a close. The obvious surmise is that the manuscript is not complete. This supposition is also borne out by comparison with manuscripts containing works on the same subject; their lists of maladies are far more complete than that of Joannes de Pisis.

The contents of the treatise are accurately described in the title: *Accumulationes receptarum*, that is, a collection of receipts of all kinds. There are practically no descriptions of diseases or illnesses, no lists of symptoms and no evidence at all that the text was to be used by anyone unfamiliar with the maladies he discusses. It may be that John's *Practica*, which, as far as we know, is no longer extant, dealt adequately with this side of the doctor's needs, and that the *Accumulationes* were meant to supplement it by culling the best known remedies from the acknowledged authorities. But whatever its purpose may have been, it reels off, without indicating any particular preference, prescriptions of various kinds, some for the rich, others for the poor, reminding one very much of a note book into which a medley of nostrums has been copied before being systematized. Some of these receipts differ from one another very little, except in the number of their ingredients, and one would be hard put to it to know which were more likely to prove effective.

The sources of the receipts are rarely given; but from time to time the names of celebrated physicians crop up in connection with a particular remedy, and these evidently indicate the text books which John had read and excerpted. Among them are to be found Hippocrates, Aristotle, Galen, Rabbi Moyses, Mesue, Serapion, Razes, Avezoar, and Avicenna. These, of course, are names which might occur in any book of the same period. But there are others which show his familiarity with mediaeval writers, such as Michael Scot, Nicholas, Gilbert, and Gentile of Foligno, and particularly those of the school of Montpellier, like Arnold of Villanova, Jourdan de Ture, and Jean Jacme (Jacobi). Indeed, as one might expect

from a master of Montpellier, a great number of the remedies have been taken *verbatim*, but without acknowledgment, from Arnold of Villanova, and a careful comparison of the texts shows that this author was John's chief source. This, together with other details such as the French forms of certain words, references to north Africa and "regio Bella marine," confirm that John was writing in a French centre for people living in a French locality.

Although the book was conceived on a logical basis, the author does not always keep to his subject, and he invariably rambles off on to a side track, as if he had suddenly remembered that some other disease could be cured by the same remedy. Sometimes, for no clear reason, he inserts verses which have no close connection with the matter in hand: for instance, when he is dealing with diseases of the matrix, he adds:

> Vir generasse viros generasse que femina fertur,
> Dum plus in cohitu seminis alter habet.[13]

And later in the same chapter, without any obvious reason he says:

Mulier est immobilior viro .xv. proprietatibus. In curatione posterior. In sexu fragilior. In peccando prior. In resistendo debilior. In corrisendo promptior. In irascendo crudelior. In loquendo fallatior. In iurgando clamosior. In aliciendo sagatior. In rebellando promptior. In retinendo tenacior. In excusando mendacior. In fallendo efficacior. In accipiendo rapacior. In cogitando mala paratior.

All this is, no doubt, quite true: but it is more apposite in a book of morals than in a treatise on medicine.

The list of purgatives inspires him to quote:

> Se medicum fingit scriptor, ydiota, prophanus
> Judeus, monachus, hestio, tonsor, anus.[14]

whilst the colour of his patients' complexion brings to his mind two lines of verse from Mesue's prologue to the *Medicina particularis*:

> Tu qui geris curam corporis auxiliari non differas:
> Semel enim pereunti nulla suffragia prosunt.[15]

The most scrappy chapter of all from this point of view is the one that deals with children. Here he lumps together instructions on how to find the new moon, indications that foretell whether a man will die or not,

[13] I have not succeeded in discovering the source of these lines.

[14] S. De Renzi, *Flos medicinae Scholae Salerni*. Naples 1859, X, cap. 4, lines 3472-3. Our text has: *Sed medicum fugit*.

[15] Joannis Nazareni filii Mesue *Grabadin medicinarum particularium*. Venice 1513, fol. R 1.

hints on how to drive flies from the house, methods of drawing out thorns and barbed weapons, five things for warding off old age, lists of hereditary and contagious diseases and remedies for convalescents. But on the whole he keeps to his programme, and so we are able to gather some idea of his teaching.

What strikes one at first reading is the little progress that seems to have been made during the centuries that intervened between, say, the ninth and the fifteenth centuries. One looks in vain for any evidence of the use of new drugs: the remedies are based on the same herbs, the same minerals, the same animal products as were those of the early period of the Middle Ages. Some of the prescriptions may be more elaborate, others may differ in the manner of administration: but on the whole, there is little if any change to mark the slightest progress. It is as if the attitude towards disease and its cure had become fossilized. What makes this the more noticeable is the constant intrusion of elements of folklore, of superstition, and number symbolism. All through the remedies runs this thread of fantasy: take three or five or seven pills, leave the concoction nine days in the sun, gather it at dawn on the first of April or July, and so on. If you wish to cure a tumour of whatever kind, take a rope and boil it vigorously in water: then cut it into shreds with a knife on a wooden block: afterwards grind it in a mortar with a rough pestle and mix it with pork fat. This will remove all kinds of unnatural growths and tumours and will also take away any pain in the ears.

Side by side with these old-wives' nostrums there are passages which show a more serious approach to the physician's problems. His treatment, for instance, of leonine leprosy sounds much more rational and is pursued at great length in a logical manner. Attention, he says, must first be given to blood-letting. It should be done from both cephalic veins, and two cupping-glasses should be placed after scarification between the shoulder-blades: this should be carried out *three* times in Spring and *three* times again in autumn, but on each occasion the amount of blood taken should be moderate. Secondly, attention should be paid to digestion and evacuation, and to assist these he gives a list of carminatives and purgatives: they are to be administered in autumn at the beginning, middle, and end of the month. Thirdly, after purging, the patient should be treated with vapour baths in which are placed the same herbs (with the exception of sugar and honey) as those used in the preceding phase of the treatment, namely borrage, fumitory, scabious, anise, liquorice and so on. This should continue for *nine* days. Next, careful attention should be paid to the patient's head: every morning for *nine* days, one or two drops

of the extract from marjoram, elder bark, should be poured into each nostril. Fifthly, cautery must be carried out on both arms, setons should be inserted in the head and neck, so that in all four cauteries are made. Sixthly, "serpents" should be considered. Eels are to be taken in spring from places which are dry and distant from water. They should be beaten gently with twigs, the head and tail thrown away, then washed and cleaned, and a broth made of the flesh. Without this nothing can be done. The seventh part of the treatment is concerned with the nodules and the unhealthy flesh. These should be treated with an ointment (not specified), pulled off with tweezers, and the sore place covered with a plaster made of litharge and the patient's blood. Then the closing up of the nostrils should be attended to. An unguent should be placed there during the whole night, and early in the morning the patient should snuffle through the nose pure white wine. Ninthly, care must be taken to make the hair grow again. This is effected by using an ointment made of the bark of chestnut and hazel, burnt bees and flies, a little maiden-hair, spikenard and laudanum, all boiled together with burnt mole and then mixed with oil of laurel and wax. The place where the hairs are to grow should first be scarified and then smeared with the ointment after leeches have been applied. The tenth consideration should be given to the clearing up of scars. So take methridatum and Alexandrian gold, and liquefy them in camomile oil: anoint the face and body and leave all night. Next morning wash it all off with an infusion of bran, anoint with oil of tartar, and continue for several days with various other concoctions. The most effective of all is washing with the blood of hares, which restores the beauty of the skin in a most wonderful way. Lastly, the greatest care should be exercized in the choice of a diet. This is reducible to avoiding all hot things, such as pepper, chives, wine; all cold foods, such as herbs and vegetables, meat, such as wild hare, food that corrupts easily, such as milk, fish, and pork. Moreover, the patient must avoid all anxiety, not get too hot or too cold, never pass through dirty places, keep in the fresh air, eat good bread and drink clean water, and, whenever possible, choose poultry for his meals, though not water-birds.

What kind of cure this treatment brought about it is impossible to say: perhaps it was quite ineffective, but, at least, the patient was put through a course of bleeding, cauterizing, anointing, and dosing which would make him feel that no stone was being left unturned in the effort to restore him to health. It comes as something of an anticlimax after reading through these detailed instructions to find that John has a much shorter, and apparently more efficacious, remedy for leprosy, for he goes on to

say that if you take four kites (crows ?) and pluck them alive, and then, after cutting them into small pieces, put them in a clean pot in a baker's oven until they are reduced to powder, you can drink this powder each morning in four glasses of wine, and this will undoubtedly bring about a cure. He also suggests (*habeo experimentum*) that only the heads, legs, and feet, together with the intestines, should be pulverised in the pot: in this case, you have to mix the powder with wine and drink it for only nine days. But of course, the best method of all is the regimen, which he prefaces with the words *Deus mihi adjutor,* the opening words of psalm 117. One sees why this should be so if one looks at the ensuing words of the psalm: it continues: *non timebo quid faciat mihi homo, Dominus mihi adjutor, et ego despiciam inimicos meos.* This regimen, which is both curative and prophylactic, is evidently his own personal contribution to the cure of leonine leprosy and is interesting because he is not copying slavishly from some other writer's book. But as a matter of fact, on close examination it proves to be nothing more than an elaboration of the usual dietetic regimes prescribed for the more ordinary illnesses, and hardly different from the final remarks appended to his ten stages of treatment already mentioned.

One cannot avoid drawing the conclusion from his emphasis on certain details of the regimen, that lack of personal hygiene was the cause of many of the ills he describes. Again and again he talks about fleas and lice, but he discusses it in so detached a manner that he almost seems to take for granted that most people are plagued with them. Indeed, he appears to suppose that they are produced more by the heat of the body and hot air than by dirt: they are born at the extremities of the pores where heat is generated between man's flesh and his skin, or they are born in heated air *praecipue si misceatur calor spiritus exhalatus.* These lice, fleas, and nits seem to have infested the hair too, and as shaving and hair-cutting was a rather infrequent affair, one does not need much imagination to picture the discomfort most people had to bear. The remedy against it was *aromatizatio,* perhaps a kind of fumigation with aromatic herbs, or even the mere application to the hair and beard of scented powders and liquids. If they infested the body, the best way to get rid of them was to pour goat's blood into a bowl and leave it somewhere in the house, or to place a piece of wood smeared with goat's fat in a prominent position: the fleas would then quit their human habitat and congregate either round the bowl or the wood. A more drastic cure was to take an infusion of colocynth. What is remarkable is, that though John prescribes various forms of baths to be taken by patients who suffer from other ailments, it never

occurs to him that a liberal application of soap and water would have delivered most people from their plague of fleas and lice. It is no wonder that he gives elaborate instructions for the making of *pomum ambre,* (one kind for the rich, another for the poor); for the stench of the crowds at public assemblies, such as church ceremonies, fairs, banquets, etc. must have been intolerable, particularly in a hot climate such as the south of France experiences.

There is little doubt that dirt was a great contributing factor in the spread of disease in the Middle Ages, and John seems to recognize this when he gives two lists of contagious and hereditary diseases. The contagious diseases, *qui contingunt approximando corpora,* are leprosy, scabies, small-pox, scrophula, pestilential fevers, *apostemata venenosa,* phthisis, and ophthalmia, whilst the hereditary ones, leprosy, gout, phthisis, tinea, and others are caused by the parental seed. *quia sunt maculata.* The two other chief causes of bad health are infected water and bread made from sub-standard ingredients. During the course of the treatise there are frequent references to these two topics, and in one place he remarks that there is more disease caused by bad water than by anything else. His practical advice, however, on discovering whether or not water is good enough to drink is limited to the following experiment: put some wheaten bread into your well, and if the water is poisonous, your bread will become stained and blue. Or put some water in a vessel and leave it over night in the open air: if it is musty or thick by the next morning, it is infected. He gives no tests for judging the wholesomeness of bread, possibly because there were none, and the only way of finding out whether this staple food was good or bad seems to have been the final painful result, the *ignis Sancti Antonii,* where the limbs blackened and fell off.

As usual, a number of diseases are attributed to worms. There are worms in the hair, worms in the ears, worms in the teeth, and, of course, worms in children. None of these are differentiated, and one might almost conclude from the way he speaks of them that they are merely varieties of the same species. For worms in the hair we have already seen that he prescribes aromatics; for worms in the ears he advises the use of a fasting man's saliva, which if injected into the drum will immediately kill them; for worms in the teeth he prescribes oil of roses or a theriac *de lilio Pauli.*[16] But for worms which grow in suckling infants, it is not advisable to administer medicine by the mouth, because the child would lose its taste for milk and so would die of malnutrition. If the worms

[16] Arnaldi Villanovani *Opera omnia.* Ed. Nic. Taurelli, Basileae 1585, col. 462.

come up towards the mouth to feed, place a cloth steeped in milk or honey at the mouth of the child and they will come out. But if they go downwards make a liniment from the oil of bitter almonds, oil of prunes, the juice of basil, mint, seed of smallage and purslane, mix it with wax and put it on the stomach. This will drive them out. If the children are of an age when they take solid food, give them wine in which the rinds of pomegranate and ash-tree root have been placed, or goat's milk with basil and mint. Other remedies are powdered fig and aloe placed on the navel and buttocks, or a plaster made from strong vinegar, a little absinth, and the powder of green fennel: *mirabiliter vermes expellit.*

In connection with this treatment of children's ailments, it is interesting to note that he does not advise the giving of medicines such as are prescribed for adults: he considers that it is better and safer to make local applications of plasters or ointments to the parts of the body affected. If a child suffers from a cough, for instance, the first thing to do is to impose a regime on the nurse and make her take a course of treatment, as if she had a cough herself. The reason is that the nurse, in so doing, produces milk which contains elements antagonistic to the child's illness, and in this way cures the cough, But beyond this, the child's chest should be rubbed with butter, powdered hyssop, salvia, orris, and calamint, all compounded together, and a kind of plaster covered in wool should be tied to the body. Similar treatment should also be followed in the case of fevers, diarrhoea, vomiting, and trembling of the limbs. The only case in which he countenances the direct giving of medicine is when children are too talkative at night. One can sense behind this the irritation of tired parents trying to snatch a few hours' rest from the constant chattering that drives them frantic during the day, and their impatience with plasters and ointments that must, of their nature, be rather slow in achieving results. So he counsels the mixing of *tryphera magna* [17] with the mother's milk and giving it to children just before they go to bed. But he adds that oil of violets or the oil of roses mixed with lettuce juice, smeared on the head and stomach is also effective: alternatively, one can give syrup of white poppy to drink and anoint the forehead and temples with oil in which there is a little opium and crocus. For adults, of course, he has a great number of soporifics, some of them, one might think, rather potent.

One interesting point that occurs in this treatise, as it does in so many others, is the great anxiety shown in preserving the memory. One can

[17] *Loc. cit.* col. 456.

understand how important it was during the Middle Ages, when books were scarce and the acquisition of knowledge was a painful and expensive business, to have a retentive memory, so that what one had learned at school and read as a young man could be instantly recalled even in old age. During the fourteenth and fifteenth centuries a great number of books were written to assist students to cultivate this faculty, most of which are highly ingenious and remarkably effective.[18] But naturally, as they conceived it, the memory could not be expected to work well if it was allowed to get into an unhealthy state. The head, which encases the brain and all the other intellectual faculties, must be diligently cared for and all the passages and channels which lead ultimately to the brain must be kept clear and untrammelled. The great bug-bear was rheum, which clogged up all the passages, and so impaired the perfect functioning both of brain and memory. If oil of roses was rubbed into the head, the faculties of the intellect were strengthened, whilst a little oil of lilies inhaled each morning rid the brain of all gross humours.

This concern with memory may also have some relation with the care for the eyes. It would particularly affect students and those people whose livelihood was bound up with the reading of documents. Anyone who has had to deal with medieval manuscripts will realize at once how keen the eyesight had to be in order to cope with the very small, sometimes minute, crabbed script in which text-books were written. Nowadays one has sometimes to use a strong lens in order to decipher these dense, closely packed pages. Yet the methods of keeping the sight strong and piercing seem to have been simple in the extreme: you took the juice of two pomegranates which had been put in the sun during the summer for two months, then you sieved them and mixed the juice with aloes and long pepper. This was dropped into the eyes. Or you could comb your hair every morning with an ivory comb; alternatively you could take the bile of lark, or cuckoo.

Yet diseases of the eye were quite common, one reason, no doubt, being the smoky hovels in which most people lived. The general cure was a magpie, either roasted, or boiled, or reduced to ashes, and given in a potion. It was placed in a clean, glazed pot, left in a hot baker's oven until it became powdered, and then given to the patient to eat or drink as he thought fit: it could also be compounded in an ointment and rubbed

[18] *See* the interesting article by Frances A. Yates, "The Ciceronian art of memory," (*Medioevo e Rinascimento: Studi in onore di Bruno Nardi*), Firenze 1955, pp. 873-903, where the *Ad Herennium* of Cicero and its tradition is discussed in relation to Thomas Aquinas, Albert the Great, Petrarch, and other medieval and renaissance scholars.

on the eyes. But for leucoma something more complicated was needed, and the remedy proposed by John contains no less than twenty ingredients. It was evidently efficacious, because he himself had tried it out on a woman who had been taken to church and prayed over for four years: yet at one application she was immediately cured. But let it be noted, he says, that no remedy which clears up leucoma should be placed in the eye with any medium that is sticky and makes it adhere to the eyeball: the best thing is gum arabic dissolved in celandine, into which is incorporated a cleansing power. Make this into a paste, with powdered salt for preference, and place it in the eye with a dropper. Needless to say, there were the usual nostrums that cured everything; and one remedy that restored sight also strengthened the stomach, purged the intestines of superfluous humours, dissolved the stone and expelled the wind.

There seems to be only one instance in which John gives the symptoms of a disease: this is epilepsy. The common signs of epilepsy, he says, are the following: a yellow colour which gradually verges into white; a greeny colour of the veins beneath the tongue; an inability to hold the head erect, frothing at the mouth, a loud cry, forgetfulness, talking in one's sleep, and throwing oneself about violently. There are two kinds of epilsepsy, one *de humore,* the other *de vapore*. The second kind is the more easily cured and can usually be treated with the following remedy: take a magpie without its feathers and cook it until the bones separate from the flesh; then eat it, but abstain from physical intercourse for forty days and from meat, wine, and vegetables for a year. Here again, as in so many instances, he comes back to the fundamental question of diet, an indication of the strong, pervading influence exercized throughout the whole of the Middle Ages by the *Regimen Salernitanum*.

He even thinks that sterility can be cured by diet. A woman came to me, he says, and complained that she could not conceive, and particularly that she could not conceive sons. From the signs he observed, he presumes that it is a case of frigidity.[19] In such a case a regime must be imposed which is suitable both for the husband and the wife and common to them both. My personal opinion is (*nos dicemus*) that such a regime should cover food and drink, exercise, hot baths which are both scented (*odoriferos*) and thinning, moderate intercourse, abstinence, and purging of the body from phlegmatic humors (*materia fleumatica*). A special course must be undergone by the husband, the principal purpose of which

[19] John is evidently basing himself here on the treatise *De passionibus mulierum* or the *De secretis*, printed by De Renzi in volume four of the *Collectio Salernitana*. Naples 1856, p. 3 sq.

is to increase the sperm by means of appropriate food and drink. But it may be that the quality of the sperm is deficient, in which case, *si sit aquosum et tenue*, it must be remedied by a particular diet accompanied by heating medicines. He then goes on to list the qualities which are necessary in fertile seed, *ut sit album, spissum, grandineum, non aquosum, fluxibile*, and remarks that it should not be retained too long lest it become corrupted and thereby useless for purposes of generation. Further instructions are given about the time when intercourse is more likely to be successful, and this is connected with the man's eating habits, for he must not be too hot nor too cold, nor full to repletion nor too hungry, but about half way through the third *decoctio* of his food.[20] This, of course, varies a great deal with different men, but usually it takes place about the time he wakes up from his first deep sleep. There is a good deal more in the same vein on this topic, but it all boils down to the same elementary advice.

It is unnecessary to go into more detail in order to show the character of the treatise. But before concluding this rapid sketch of the contents of the *Accumulationes receptarum*, I am tempted to add one or two more invaluable bits of information so that my readers may not depart uninstructed. There is, it appears, an infallible cure for cancre: take the water in which farriers and smiths dip their red-hot iron, wash the affected member with it, and all will be well: this happened to a man *cui medietas virge fuit corrosa cancro*. Quinsy is easily got rid of: strangle a viper with a thread and then tie the thread round the patient's neck. But if you have difficulties in finding a viper, use the excreta of a dog that has eaten bones. It can either be swallowed or mixed with water and used as a gargle. Sometimes it may be convenient to know whether or not your patient is going to die. Anoint the soles of his feet with lard and then scrape it off and give it to the dog. If the dog vomits, your patient is doomed, but if not, he will live. Or you can collect some of his urine in a vessel and pour it over a nettle at night-time. If, by next morning, the nettle has turned yellow, the patient must be despaired of, but if it remains green, he will survive. When he is at death's door and it is imperative that he should speak (to make known his last will, for instance), a little balm water will loosen his tongue immediately: and should you wish him to live a few days longer, make him drink it in the morning every three days, and he will be able to speak for at least nine days. I have tried it, says John, and it works: *sum expertus*.

[20] Which took place, according to current theories, in the liver.

This, then, is an example of the type of teaching that was being disseminated at Montpellier at the beginning of the fifteenth century. When one considers that the author of this farrago was not merely a doctor of medicine, but a professor and a chancellor of the University as well, it comes as no surprise to learn that Montpellier was losing its attraction as a centre of studies. There is not the slightest trace of any effort to progress beyond the bounds already set centuries before; there is not the faintest attempt to bring in any innovations either in the diagnosis of disease or in the preparation of drugs. The pages read like the babblings of an old woman with her farm-house quackery, a monument, if not of illiteracy, at least of irrationality. One can only marvel at the fortitude of the patients who bore so stoically the crude treatment meted out to them and conclude that the human body is a very tough and resilient organism indeed.

PATHOLOGY AT THE NEW YORK HOSPITAL, 1810-1932

CHARLES T. OLCOTT

The purpose of this paper is to consider the largely independent development of laboratory medicine, especially pathology, in the hospitals and medical schools of New York City, which were later fused, in the early decades of the 20th Century, to form the present medical centers. Especial reference will be made to The New York Hospital, one of the oldest hospitals in what is now the United States.

It is first necessary to emphasize the fact that " The Hospital," as it seems to have been originally called, was from its inception a teaching institution much more on the model of the hospitals in London than on that of the later German hospitals, which played a relatively minor part in medical education compared to that of the universities. The New York Hospital was incorporated in 1771 for the relief of the sick and the education of doctors (22), but it was not opened until 1791. In the light of the pioneer role of the University of Leyden in clinical instruction (5), it is interesting to note an early statement in the records of The New York Hospital to the effect that the instruction there followed the method of Hermann Boerhaave of Leyden, who died in 1738, six years after the publication of his classic *Elementa Chemiae* (5).

Although Peter Middleton held the chair of " Pathology and Physiology " in the faculty of King's College when it was founded in 1767 (8), it is questionable if he should be considered a pathologist in the modern sense of the term, in spite of the several autopsies he is known to have performed . Certainly the term was first used at the hospital at a much later date. Also it seems that the lectures at the college were exclusively didactic, the practical instruction of the students being imparted by apprenticeship or in the hospital. Garrison (5) calls Middleton's well-known " Discourse," delivered at the opening of the College in 1767 and published in 1769, the first American article on medical history.

Other members of the original faculty of King's College who later served as founders and Physicians at The Hospital were Drs. Samuel Bard and John Jones. Bard was the author of the first American contribution on medical ethics in 1769 (5), and Jones wrote the first American treatise on military medicine in 1775 (5). It is of interest that Dr. Wright Post, Surgeon at the hospital, lectured on anatomy at the hospital rather than at the college in 1791. From the earliest times the students

at King's College and later at the then independent College of Physicians and Surgeons attended the "clinics and used the library and other facilities of the Hospital" (22).

Early Autopsies at The New York Hospital

The earliest autopsies of which the records are extant were performed in 1810 and served as appendices of clinical histories. By 1812, reports of necropsies such as that on Case 60, previously reported (10, 20), would be considered adequate in regard to the gross findings today, except for such anachronisms as "considering the significance of the principle of sympathy" between the liver and its "morbid neighbors." Or is this early Psychosomatic Medicine? This autopsy was performed under the direction of Dr. Samuel Latham Mitchill (1764-1831), who was at times Representative and Senator in the Congress of the United States, as well as attending physician at the hospital and one of the editors of the first medical journal in this country, the *Medical Repository*.

"The Medical and Surgical Register consisting chiefly of cases at The New York Hospital" was written by John Watts Jun., M. D., Valentine Mott, M. D., and Alexander H. Stevens, M. D. in 1818 and 1820 (28). The first mentioned author was a Physician, the last two Surgeons at the Hospital, so that here again clinicians presented the clinical and necropsy material.

The Pathological Cabinet

The appointment of Dr. Gustavus A. Sabine as Curator in 1841 may be said to be the earliest indication of the separation of pathology from the other divisions of the hospital. Dr. Sabine had worked in the Pathological Cabinet of Sir Charles Bell in England. He contributed the first specimen listed among those presented before The New York Pathological Society when it was founded in 1844, a case of "Melanosis of the Liver" (17).

The duties of Curator are defined in a somewhat later publication (21). They are quoted in part:

1. "The Hospital Cabinet . . . shall . . . be under the immediate charge of the Curator, who shall be appointed by the Governors, on the recommendation of the Physicians and Surgeons."

2. "It shall be the duty of the Curator to attend all surgical operations in the hospital, and to superintend and direct all the postmortem examinations in which he shall be aided by the Medical and Surgical Walker to whose division the case to be examined belonged; and he shall collect, prepare, and deposit in the Cabinet

all such specimens, occurring in or presented to the Hospital as are thought worthy of preservation; each with its appropriate label and reference to the catalogue. . . ."

Thomas M. Markoe served as curator following Dr. Sabine. Dr. Markoe was Professor of Pathological Anatomy at the University of the City of New York from 1852 to 1855, but he was known especially as an eminent surgeon and served The New York Hospital as an Attending Surgeon from 1852-1892. Among other eminent physicians and surgeons serving as curator we find the names of Cornelius Rea Agnew and of Robert Ray, Jr. Dr. Agnew (25) was born in 1830, graduated from Columbia College at 18, and began the study of medicine under Dr. J. Kearny Rodgers. He served as " Junior Walker " and " Senior Walker " at The New York Hospital before he graduated from the College of Physicians and Surgeons in 1852 and was House Surgeon at The New York Hospital from May 1853 to May 1854, and Curator from 1857 to 1858. He embarked on a career of general practice and practice in the diseases of the eye and ear. He was at one time a member of the Sanitary Commission and made an important contribution to its work of forwarding supplies to Union soldiers during the Civil War. He died in 1888. (A number of other Curators became Attending Surgeons to the hospital). Reference is made to Dr. Ray's contributions below.

Autopsies were frequent. To take one year as an example, in 1852, 3877 patients were treated in the hospital, with 353 deaths and 110 autopsies. The earliest manuscript catalogue of the Cabinet still available was started in 1848 (11); it is still in one of the museum cases (1959) along with specimens from as early as 1850. An example is a specimen of the tendon and other structures of a human wrist in which the gouty deposits are still preserved. In the same case there is a copy of a *Catalogue of the Pathological Cabinet of the New York Hospital* printed in 1860 after the death of its compiler, Dr. Robert Ray, Jr. (21). Ray was House Surgeon from 1857-1858 and Curator in 1859. This volume contains 959 carefully indexed records of specimens. It is of interest that it was dedicated to " the students resorting to The New York Hospital for acquiring a knowledge of morbid anatomy, as well as for the advantages of clinical instruction " (27). In this connection it should be noted that a pathological museum existed at Bellevue Hospital as early as 1857. These were in addition to the extensive collections in the hands of private physicians and surgeons, such as the notable well-cataloged one of Valentine Mott.

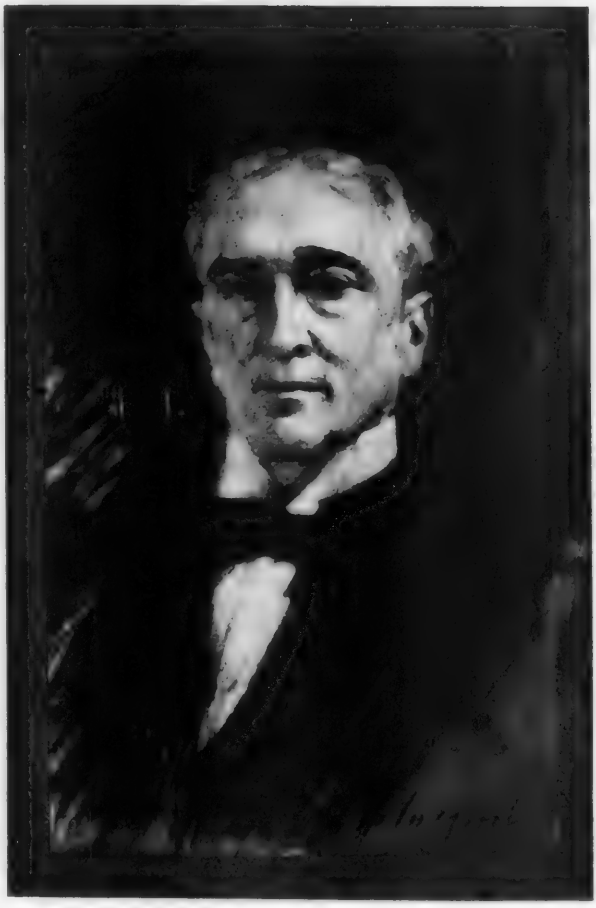
Microscopic Pathology at The New York Hospital

The first communication from the Pathological Cabinet based on microscopic study was reported by Dr. John Appleton Swett in 1853 (24). It was entitled "Observations on the pathology of Bright's disease." He quotes Dr. (initials not given) Van Arsdale. Dr. Swett had served as the first president of the New York Pathological Society in 1844, and was an Attending Physician at the hospital (19). A Dr. Van Arsdale was the first Microscopist in 1853. This Dr. Van Arsdale was clearly one of the *two* Henry Van Arsdales who were Founders of the New York Academy of Medicine in 1847, but there is no way of ascertaining whether he was the one who received his M. D. from the University of Pennsylvania Medical School in 1838, or the one who "entered" the College of Physicians and Surgeons, Columbia University, in 1839. Nor is there evidence, except for similarity of interest, that the New York Hospital Microscopist was responsible for the descriptions and beautiful microscopic plates added to the American Edition of Arthur Hill Hassal's *Microscopic Anatomy of the Human Body in Health and Disease,* by Henry Van Arsdale (of 112 West 22nd Street) in 1855 (6).

Among the records of the New York Hospital there are drawings made in 1856 that show the microscopic picture of carcinoma of the breast (12, 20). These were made when Dr. William H. Draper was the Microscopist to the hospital (1856-1860). Dr. Draper received his M. D. from the College of Physicians and Surgeons in 1856 and was Attending Physician at the hospital for most of the time between 1863 and 1896 (25, 29). Some of the drawings resemble those appearing in Julius Vogel's *Icones Histologiae Pathologicae* in 1843 and reproduced by Long (9).

The Second Hospital Building

The first buildings of The New York Hospital were sold in 1870. Two smaller buildings, each known successively as "The House of Relief," carried on from 1875 to 1919, and the hospital pathologists performed many autopsies there, but the main hospital was not reopened until 1877, this time between 15th and 16th sts. west of Fifth Avenue. This second hospital differed from the one on lower Broadway in many ways. Instead of being surrounded by spacious grounds, it was closely adjacent to other structures. More important than this, the leadership in medical education, which had been shared with Bellevue Hospital "since public instruction was started there in about 1804" (25), was further divided with the



Photograph of charcoal drawing of Dr. William Henry Draper (1830-1901) by John Singer Sargent.

(Kindly given the department by Dr. Draper's family).

opening of the newer hospitals such as St. Vincent's, 1849; Mount Sinai, 1855; St. Luke's, 1858; German, now Lenox Hill, 1869; Roosevelt, 1871; and Presbyterian, 1872 (25). It seems, looking back on it from the present time, as if The New York Hospital of the period to be described were just one of the better hospitals of the city instead of holding its former unique position. Although far removed in location from the medical schools with which it was affiliated, it will be shown that this separation was no greater than that of The College of Physicians and Surgeons and its affiliate hospitals after the former had moved from near Bellevue to West 59th Street. Bellevue Hospital was the close neighbor of The Bellevue Hospital Medical College and The New York University Medical College. When these colleges joined, they were still close to Bellevue, as was also Cornell Medical School.

There were four physicians in charge of the laboratory service at The New York Hospital: Drs. Peabody, Ferguson, George Biggs, and Elser.

Dr. George L. Peabody, Pathologist 1878-1888: Instruction in Pathological Histology is Instituted in Three Institutions in New York City

Dr. George Livingston Peabody was born in 1850, received an A. B. degree at Columbia in 1870, and on A. M. and M. D. at the same college in 1873. He then went abroad, where he studied at Vienna and Strasbourg. He served as the first Pathologist at The New York Hospital from 1878-1888, as well as being Attending Physician, an apparently much more sought after position, from 1884-1909. He was also an Attending Physician at Roosevelt, St. Luke's, and Bellevue Hospitals at various times, as well as Professor of Therapeutics at the College of Physicians and Surgeons from 1897 to 1903. His interests are listed in American Men of Science as pathology, therapeutics, and internal medicine (1).

While Dr. Peabody was Pathologist, the hospital took part in a revolutionary development when it was one of the three institutions that started a course in histology at approximately the same time, namely in 1878 and 1879. It is impossible to establish priority, but the Report of The New York Hospital for the year 1878 (16) states:

> In addition to the maintenance and development of the Cabinet, the Pathological Department has, during the past year, entered upon a new field of labor. A commodious laboratory has been fitted up and well-supplied with microscopes and other apparatus, and instruction in Histology has been regularly given during the present season. It is believed that this enterprise, now only begun, will supply a

want long felt in medical education; and though but few students can now be accommodated at a time, it is likely that in the future its advantages will be extended to a wider circle by the giving of instruction in Pathology and Histology at the same time to different classes.

In the catalogue of the Bellevue Hospital Medical College (7), again for 1878, the following announcement appeared, "The Faculty have recently established in the College a Pathological Laboratory for private teaching in the use of the microscope, under the direction of Professor Janeway and Dr. W. H. Welch. This is intended to supply a want, long felt by medical students, of thorough instructions in Pathological Histology, which has never been completely met in this country." Dr. Welch had returned from Germany where he had studied under Von Recklinghausen, Ludwig, and Cohnheim (4). His subsequent monumental work at Johns Hopkins Medical School is better known than his tremendously significant pioneer work in New York City.

Dr. T. Mitchell Prudden, who had also studied in Germany, had opened a pathological laboratory at the College of Physicians and Surgeons in 1878 (4) and inaugurated histological instruction there in 1879 (23).

Dr. D. Bryson Delavan was Assistant Pathologist and Curator under Dr. Peabody from 1879 to 1881. It is perhaps pertinent to include a personal recollection of Dr. Delavan. When I saw him in his old age, following a brilliant career in laryngology, he reminisced about the older days and seemed more proud of his title of Curator than of having been called the first of the Assistant Pathologists. Incidentally he was the last physician carrying the title of Curator.

Three different series of records were established when Dr. Peabody became Pathologist of the newly opened hospital building. The autopsy series then instituted numbered about 7300 when that building was closed in 1932. It is now past 18,000 (15). A second series of reports was first called "Tumor Books," although their contents were by no means limited to neoplasms; these were later and more accurately called "Pathological Reports." This combined series contained over 45,000 entries when it was closed in 1932 (14). A further series of reports consisted of additional museum catalogues listing current and previously collected material. There was a total of 3300 or more entries in the museum catalogues before they were abandoned in 1897. The Catalogues of 1878 (13) contained well worked-out descriptions of such pathological entities as colloid carcinoma of the rectum and gumma of the skull. During Dr. Peabody's tenure an average of 168 necropsies were performed and 83 surgical specimens examined a year.

Dr. Frank Ferguson, Pathologist 1888-1895

Dr. Frank Ferguson, also known as Dr. Farquhar Ferguson, graduated from the Long Island College Hospital Medical School in 1880 and served as Assistant Pathologist at The New York Hospital from 1882, as well as Pathologist at St. Luke's, Long Island College, and New York Hospitals and The House of Relief at various times. Although he practiced clinical medicine, he was said to have performed or assisted at 5000 autopsies in all (26). He was at different times Professor of Histological and Pathological Anatomy at the Long Island College Hospital Medical School and Professor of Pathology and Clinical Medicine at the New York Postgraduate Medical School. Dr. Ferguson contributed a number of articles and case studies before The New York Pathological Society, including " The diagnosis of tumors of the bladder by microscopical examination " in 1892 (18). The Assistant Pathologists at this time were Walter B. James, Henry W. Stevens, and Dr. George P. Biggs. During Dr. Ferguson's tenure as Pathologist, an average of 158 autopsies were performed annually and 367 specimens examined at the main hospital. Interest in the Pathological Cabinet seems to have decreased sharply, but even the last specimens were beautifully described (13). The same building that housed The Cabinet housed on the floor above a famous medical library, later an important source of books for The New York Academy of Medicine.

Dr. George P. Biggs, Pathologist 1896-1905

Dr. George Patten Biggs was born in 1867 and was 8 years younger than his cousin, the distinguished public health official Hermann Biggs, who greatly influenced George Biggs by his inspiring example. The cousins graduated at different times from The Bellevue Hospital Medical School, George in 1889. George did many autopsies at Bellevue Hospital both as a student and as an interne, presumably under the direction of Dr. Hermann Biggs. He studied in Europe after his appointment to The New York Hospital, where he served as Assistant Pathologist from 1891 to 1895. He was Pathologist to the Health Department of New York City from 1894 to about 1926. In 1892 he presented about 20 specimens before The New York Pathological Society (18), including: 1) a case of ulcerative endocarditis with multiple abscesses throughout the body that contained staphylococci, 2) a case of " so-called interstitial myocarditis " with calcification and thrombosis of the left coronary artery, 3) a hydatid cyst of the liver with scolices and hooklets of echinococcus,

4) " acute yellow atrophy of the liver," and 5) two cases of " hemorrhagic pancreatitis."

Dr. Biggs spent much time working in the antitoxin laboratory under Dr. William H. Park. He lectured on pathology at the University and Bellevue Medical College from 1898 to 1903, also on hygiene at Cornell University Medical College. He considered himself a full-time pathologist and laboratory worker and apparently relegated whatever practice he had to the times before and after his regular working day in the laboratory. He was more or less in retirement after 1926 and died in 1955. Dr. Biggs thus is clearly the first full-time pathologist at The New York Hospital, in contrast to Dr. Peabody and Dr. Ferguson, who were not eminent primarily as pathologists.

Three Assistant Pathologists served under Dr. George P. Biggs: Drs. Lewis A. Conner, Joseph C. Roper, and William J. Elser. During Dr. Bigg's term of service there was a yearly average of 116 autopsies and 615 surgical specimens at the main hospital. Dr. Biggs told me, when I saw him in 1955, that during his time as pathologist the museum had become " static." Sheldon (22) writes that " in 1901 because of lack of room for their exhibition the larger number of specimens (from the Pathological Cabinet) was distributed among the laboratories of several medical colleges." Many were sent to Dr. James Ewing's department and carefully preserved by him at Cornell. These, together with the specimens he collected from other sources, form the nucleus of the collection at the present medical center. I understand that the specimens sent to The College of Physicians and Surgeons have been discarded long since.

Dr. William J. Elser, Pathologist 1906-1915; Director of the Laboratories, 1916-1932

Dr. Elser was born in 1872 and graduated from The Bellevue Hospital Medical College in 1895. After an internship in the United States he studied from 1897 to 1901 in Berlin, Vienna, and Graz. He was connected with The New York Hospital from 1902 to 1940 as Assistant Pathologist, Pathologist, Director of the Laboratories, and at York Avenue, Director of the Central Laboratories. At the same time he was on the staff of The Cornell Medical School from 1901 as Assistant in Pathology, later Professor of Bacteriology and Immunology, and from 1932 as Professor of Applied Pathology and Bacteriology. He was in charge of the laboratories at Base Hospital 9, manned by The New York Hospital and in a later part of the First World War, Assistant Director of the Division of Laboratories and Infectious Diseases of the A. E. F.

He published " Studies on meningitis " with Dr. F. M. Huntoon in 1909 (2), and an article on preservation of sera, etc., in the frozen state, with Drs. Thomas and Steffen (3).

Working with Dr. Elser as Assistant Pathologists, or, after he became Director, as Pathologists were: Dr. Frederick B. Humphries, Dr. Douglass Symmers (who served for many years in the Department of Pathological Anatomy at Cornell), Dr. Arthur F. Coca, Dr. George W. Wheeler, Dr. Henry R. Muller, Dr. Elise Strang L'Esperance, Dr. William R. Beattie, Dr. James Denton, Dr. Gilbert G. Dalldorf, and Dr. Lawrence W. Smith, in addition to a number of Assistant Pathologists.

The laboratory services of The New York Hospital were becoming increasingly active before, and especially after, the First World War. During the last years of the 16th St. Hospital, Dr. Elser was in general charge, Dr. Ralph G. Stillman the Clinical Pathologist, Dr. George W. Wheeler the Bacteriologist, Dr. Arthur F. Coca the Immunologist, and Dr. Alice Bernheim the Chemist. Our concern, however, is primarily the sub-department of Pathology.

This was, during the later years, in the direct charge of two men at a time—the Pathologists previously listed and their Assistant Pathologists. These men performed practically all the necropsies and did the Surgical Pathology for the hospital. Autopsies took place at the rate of about 100 annually from 1906 to 1926, but at the rate of 180 a year from 1926 to 1932. Surgical pathological specimens were examined in ever-increasing numbers. The annual average was 916 from 1906 to 1915, 1440 from 1916 to 1925, and 1880 from 1926 to 1932. Frozen sections were studied near the surgical amphitheater, but the bulk of the work was done in the laboratory alongside of the autopsy material. There was one serious shortcoming in the laboratory set-up in the 16th St. hospital, namely, entirely inadequate animal quarters. This made animal experimentation practically impossible.

The Relationship of The New York Hospital to Cornell University Medical School

Reference has been made to the close relations of The New York Hospital to the medical schools of King's College, Columbia University, and the sometimes separate College of Physicians and Surgeons. This cooperation continued until the time of closure of the 16th St. hospital in 1932 but became decreasingly important, so that during the last years at that site professors from P & S were only in charge of two of the clinical services. At the same time the staff of Cornell Medical College

took over increasing responsibilities and manned the other two clinical services and the entire laboratory service. It is interesting to note that both Dr. William R. Williams of the Columbia—P & S medical division and Dr. Lewis A. Conner of the Cornell medical division had served with distinction for considerable periods in The New York Hospital autopsy service.

During the last twenty years at West 16th St., the pathologists and assistant pathologists at the hospital had concurrent appointments at the Cornell University Medical College on East 28th St. under either Dr. James Ewing, Professor of Pathology, or Dr. Otto N. Schultze and his successors of the distinct but affiliated Department of Pathological Anatomy. It is certain that the separation of the hospital and the medical school was an even more serious handicap to the students than to the staff. There were times when the students had seen relatively few autopsies before entering on the clinical clerkships at the hospital during their third year as medical students.

This geographic dispersion of the responsibilities of the men serving both as hospital pathologists and university professors was in a similar degree experienced in other institutions. For instance, Dr. Eugene L. Opie served concurrently on the staff of Rockefeller Institute, Presbyterian Hospital and P & S in 1907 to 1910; Dr. W. G. MacCallum was Pathologist first at the Lenox Hill Hospital and later at the Presbyterian Hospital, while Professor at P & S; and Dr. William C. Von Glahn served at both The Presbyterian Hospital and the College of Physicians and Surgeons from 1920 to 1928, before those distinguished institutions formed the Medical Center on Washington Heights.

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29. Winfield, J. McF.: *A Cyclopedia of American Medicine (1610-1910).* H. A. Kelly, Ed., Phila: W. B. Saunders, 1912.

INFLUENCES ON THE FOUNDER OF THE JOHNS HOPKINS UNIVERSITY AND THE JOHNS HOPKINS HOSPITAL

FRANKLIN PARKER

Known documents mention the influence of three individuals upon Johns Hopkins in founding The Johns Hopkins University and The Johns Hopkins Hospital. Since my interest in this question first arose in gathering material for a biography of George Peabody (1795-1869), and the documents relating to his acquaintance with Johns Hopkins are most extensive, a review of their acquaintance follows first.

George Peabody and Johns Hopkins were born the same year, 1795, Peabody on February 18 in Danvers (now Peabody), Massachusetts; Hopkins on May 19 in Anne Arundel County, Maryland. Hopkins left his Quaker farm home in 1812 to become a grocer in Baltimore. Peabody left Massachusetts about the same time to become a dry goods storekeeper in Georgetown, D. C., and then a partner in the mercantile firm of Riggs, Peabody & Co., in Baltimore. In 1822 Hopkins had founded the firm of Hopkins & Brothers which traded in Maryland, Virginia, and North Carolina; Peabody had become the traveling buyer of Riggs, Peabody & Co., which had branches in New York and Philadelphia.

From merchandising both men turned, independently, to financial investments in banks and railroads. Hopkins remained in Baltimore to make his fortune; Peabody left Baltimore for London where his brokerage firm became the genesis of the banking firm of J. P. Morgan & Co.[1]

Both men used their wealth for philanthropic purposes. Peabody founded the Peabody Institute of Baltimore in 1857 and the Peabody Homes for working people in London in 1862.[2] During a year's return (1866-1867) after thirty years abroad, he founded the Peabody Education Fund for the Southern States and Peabody Museums at Yale and Harvard universities and in Salem, Massachusetts.[3]

Peabody's influence upon Hopkins was exercised during this year's

[1] Junius Spencer Morgan of Boston became a partner in George Peabody & Co., London, in 1854. His son, John Pierpont Morgan, began his financial career as the New York agent for this firm. Soon after Peabody's retirement in 1864, the name of the firm was changed to J. S. Morgan & Co. Peabody, a bachelor without heirs, withdrew his name from the firm, since he would have no control over its operations. Grenfell Morgan & Co., Ltd., London, is the present direct descendant of George Peabody & Co.

[2] Peabody's housing gifts to London totalled $2,500,000. More than 18,000 people live in Peabody homes in 1960.

[3] These were Peabody's best known philanthropies. He also founded other institutes.

visit to the United States. Many sources have referred to this influence but none have reproduced the original document supporting it.[4] The original document is a speech by John Work Garrett, President of the Baltimore and Ohio Railroad, on January 30, 1883, the thirtieth anniversary of the Baltimore Young Men's Christian Association. Garrett told the audience of his past money-raising efforts for the YMCA and of his securing from Johns Hopkins a $10,000 donation. He then described the occasion when he brought Peabody and Hopkins together:

> Mr. Hopkins had on many occasions introduced the subject of the disposition of his estate, and conferred with me as to the best course to take. . . . His plans . . . continued indefinite until during a visit of George Peabody to Baltimore. When a guest at my house I stated to him Mr. Hopkins' uncertainties and difficulties, and asked if I should invite Mr. Hopkins to dine with him, so that he might give his experience and views. . . . Mr. Peabody replied that he never gave advice but would if Mr. Hopkins wished, gladly confer with him. I called upon Mr. Hopkins and invited him to dine that evening, narrating the conversation between Mr. Peabody and myself. He accepted the invitation cordially. When my family left the table about 8 o'clock, I introduced the subject, and the conference continued until an hour past midnight. The conversation was remarkable. Mr. Peabody, after observing that he would give his own experience, without designing any advice, began by saying:
>
> "Mr. Hopkins, we both commenced our commercial life in Baltimore, and we knew each other well. I," said Mr. Peabody, "left Baltimore for London, and from the commencement of my busy life I must state that I was extremely fond of money and very happy in acquiring it. I labored, struggled and economized continuously and increased my store, and I have been proud of my achievements. Leaving Baltimore, after a successful career in a relatively limited sphere, I began in London, the seat of the greatest intellectual forces connected with commerce, and there I succeeded wonderfully, and, in competition with houses that had been wealthy, prosperous and famous for generations, I carved my way to opulence. It is due to you, Mr. Hopkins, to say, remembering you so well, that you are the only man I have met in all my experience more thoroughly anxious to make money and more determined to succeed than myself; and you have enjoyed the pleasure of

[4] In chronological order: John Thomas Scharf, *The Chronicles of Baltimore; Being a Complete History of "Baltimore Town" and Baltimore City From the Earliest Period to the Present Time* (Baltimore: Turnbull Brothers, 1874), p. 231; *The Johns Hopkins Hullabaloo; A Yearbook of the Johns Hopkins University, 1899* (Baltimore: Williams and Wilkins Company, 1899), pp. 9-11; Daniel Coit Gilman; *The Launching of a University and Other Papers; A Sheaf of Remembrances* (New York: Dodd, Mead and Company, 1906), pp. 10-12; Will Carson Ryan, *Studies in Early Graduate Education, the Johns Hopkins, Clark University, the University of Chicago, Bulletin No. 30* (New York: The Carnegie Foundation, 1939), p. 16. Alan M. Chesney, *The Johns Hopkins Hospital and the Johns Hopkins University School of Medicine; A Chronicle, Early Years, 1867-1893* (Baltimore: The Johns Hopkins Press, 1943), vol. I, p. 6; John C. French, *A History of the University Founded by Johns Hopkins* (Baltimore: The Johns Hopkins Press, 1946), pp. 10-12.

success, too. In vigorous efforts for mercantile power, capital, of course, and large capital, wax vital. I had the satisfaction, as you have had, of feeling that success is the test of merit, and I was happy in the view that I was, in this sense at least, very meritorious. You also have enjoyed a great share of success and of commercial power and honor. But, Mr. Hopkins, though my progress was for a long period satisfactory and gratifying, yet, when age came upon me, and when aches and pains made me realize that I was not immortal, I felt, after taking care of my relatives, great anxiety to place the millions I had accumulated, so as to accomplish the greatest good for humanity. I looked about me and formed the conclusion that there were men who were just as anxious to work with integrity and faithfulness for the comfort, consolation and advancement of the suffering poor as I had been to gather fortune. After careful consideration, I called a number of my friends in whom I had confidence to meet me, and I proposed that they should act as my trustees, and I organized my first scheme of benevolence. The trust was accepted, and I then, for the first time, felt there was a higher pleasure and a greater happiness than accumulating money, and that was derived from giving it for good and humane purposes; and so, sir, I have gone on, and from that day realized with increasing enjoyment the pleasure of arranging for the greatest practicable good for those who would need my means to aid their well-being, progress, and happiness." [5]

Garrett went on to say that Hopkins was so impressed by Peabody's experiences that he "informed me on the following day that he had determined to commence making his will." [6]

Garrett does not give the date of this meeting. However, there were only four occasions when Peabody was in Baltimore in 1866 and 1867. He first arrived in Baltimore on October 24, 1866, spoke at the dedication of the Peabody Institute of Baltimore on October 25, met 20,000 Baltimore school children on October 26, shook hands with about 3,000 Baltimoreans on October 27, and attended the First Presbyterian Church in Baltimore on Sunday, October 28.

During these busy and full days many friends called upon Peabody. He wrote letters from Garrett's house on October 30 to add to his benefactions and left Baltimore on October 31 for Zanesville, Ohio. His busy schedule and his illness make it unlikely, though possible, that the conversation with Hopkins took place during the last week of October, 1866.

Peabody's second visit to Baltimore was on November 12 and 13,

[5] John W. Garrett, *Address Delivered on the 30th of January, 1883, Before the Young Men's Christian Association of Baltimore on the Occasion of Their Thirtieth Anniversary* (Baltimore: The News Steam Printing Office, 1883), pp. 9-10; copy in The Johns Hopkins University Library; another copy among the Garrett Papers, Box 141, Library of Congress Manuscript Division; also quoted in *The Sun* (Baltimore), January 31, 1883, p. 1, c. 4.

[6] *Ibid.*

1866, on his return from Zanesville, Ohio. This was a relatively quieter period in his itinerary, and he did stay at Garrett's house. Also, Garrett's statement that Hopkins "informed me on the following day that he had determined to commence making his will" and the introduction into the Maryland Assembly of bills to incorporate The Johns Hopkins Hospital and The Johns Hopkins University in January, 1867,[7] lend weight to November 12 or 13 as the date of meeting.

Peabody was in Baltimore for the third time on February 3, 1867, where Robert Charles Winthrop of Massachusetts joined him before leaving for Washington, D. C., to meet with the trustees of the Peabody Education Fund from February 4 to 7. This third Baltimore visit was short, and Peabody had much planning to do with Winthrop in regard to his education fund, which he considered his most important philanthropy. It seems unlikely that the conversation with Hopkins took place on February 3.

Peabody last visited Baltimore and stayed at Garrett's house on April 25, 1867, before he sailed from New York on May 1 for England. Many friends did call to say goodbye. But Hopkins' will had been made out more than six months before. Bills to incorporate Hopkins' two benefactions had been introduced in January, 1867, and the certificate of incorporation of the Hospital was signed in August, 1867.[8] The most likely date of the meeting between Hopkins and Peabody was probably November 12 or 13.

Before leaving this account of Peabody's influence on Hopkins, it is interesting to note the following statement allegedly made by the evangelist, Dwight L. Moody:

> I was a guest of John Garrett once, and he told me that his father used to entertain Peabody and Johns Hopkins. Peabody went to England, and Hopkins stayed in Baltimore. They both became immensely wealthy. Garrett tried to get Hopkins to make a will, but he wouldn't. Finally, Garrett invited them both to dinner, and afterward asked Peabody which he enjoyed most, the making of money or giving it away. Hopkins cocked up his ears, and then Peabody told him that he had had a struggle at first, and it lasted until he went into his remodelled London houses and saw the little children so happy. "Then," said Peabody, "I began to find out it was pleasanter to give money away than it was to make it." Forty-eight hours later Hopkins was making out his will founding the university and the hospital.[9]

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[7] Chesney, *op. cit.*

[8] *Ibid.*

[9] Quoted in Jabez Lamar Monroe Curry, *A Brief Sketch of George Peabody, And A History of the Peabody Education Fund Through Thirty Years* (Cambridge, Massachusetts: University Press, 1898), pp. 17-18; Henry Mitchell MacCraken, *The Hall of*

Less is known about the two remaining persons who may have influenced Johns Hopkins. In his history of The Johns Hopkins Hospital and The Johns Hopkins University published in 1943, Alan M. Chesney wrote that Johns Hopkins "was advised by Dr. Joseph Parrish of Philadephia to found a hospital."[10] The source cited by Chesney, an obituary notice, stated that Dr. Parrish was born in 1818 and died in 1891, and that he was President of the Medical Society of New Jersey in 1885. The writer of Dr. Parrish's obituary described Dr. Parrish's meeting with Hopkins as follows:

> On his way to Washington, on a public errand, Dr. Parrish was met one morning at Baltimore, by Mr. Garrett (then President of the B. & O. R. R.) with whom he was well acquainted. Mr. Garrett accosting him with earnestness exclaimed in haste—"you must not leave town today. I have promised to drive you out and introduce you to Mr. Johns Hopkins as soon as possible. At 4 p. m. my carriage will come for you." Assuming that Mr. Hopkins' motive for meeting him (with which Mr. Garrett was utterly unacquainted) would justify the concession, Doctor Parrish remained and was introduced as proposed. He was received privately in Mr. Hopkins' library, who said—"I am not going to live much longer. I have millions of money, which I desire to devote to the welfare of mankind, but am totally at a loss to formulate any rational plan for so doing. I want you to advise me and tell me what to do with it." It was in vain for the Doctor to modestly protest his unfitness for such a purpose. Mr. Hopkins replied: "You *can* and *must* do it for me. I am helpless. Take the subject home with you, cogitate upon it, and let me hear from you soon." To the unaffected earnestness of Mr. Hopkins Dr. Parrish felt obliged to succumb. He promised to comply; and in a short time delivered to him in writing what proved to be the embryonic creation of the Johns Hopkins' University.[11]

In his history of The Johns Hopkins University, Dr. John C. French has dated the above encounter in 1873, the year Johns Hopkins died.[12] Unfortunately, the written plan mentioned in the above quotation has not been found among the Hopkins papers. Nor, unfortunately, did Garrett's YMCA speech of January 30, 1883, mention Dr. Parrish.

John C. French, in an article in this *Bulletin* in 1953, described the circumstances surrounding the third person who probably influenced

Fame (New York: G. P. Putnam's Sons, 1901), p. 180. John Work Garrett's YMCA speech on January 30, 1883, relates that Moody was in Baltimore the spring of 1879 and called upon him about YMCA matters. Moody may have heard of the conversation between Peabody and Hopkins at this time.

[10] Chesney, *op. cit.*

[11] *Transactions of the Medical Society of New Jersey* (1891), 243-245.

[12] John C. French, *A History of the University Founded by Johns Hopkins* (Baltimore: The Johns Hopkins Press, 1946), p. 9.

Johns Hopkins.[13] Patrick Macaulay, M. D., a graduate of the University of Pennsylvania, was eminent in Baltimore as a physician and in civic affairs. He was a stockholder and fellow director with Johns Hopkins of the Baltimore and Ohio Railroad. The two men had summer homes less than four miles apart. A library of books, many of them medical books, containing Dr. Macaulay's bookplate, came into Johns Hopkins' possession and was consequently bequeathed to The Johns Hopkins Hospital library. French is reasonably sure from his research that Johns Hopkins and Dr. Macaulay were well acquainted.

In 1824, Dr. Macaulay had printed a pamphlet entitled "Medical Improvement" in which he advocated a plan for medical education which was far ahead of its time. Specifically, Dr. Macaulay urged the necessity of a hospital as part of a medical school, since bedside teaching was "indispensable to the attainment of a proper medical education."[14] In March, 1873, Johns Hopkins instructed the trustees of The Johns Hopkins Hospital: "In all your arrangements in relation to this hospital you will bear constantly in mind that it is my wish and purpose that the institution should ultimately form a part of the medical school of that university for which I have made ample provision by my will."[15] French concluded that it was these ideas of Dr. Macaulay's "which may have influenced the thoughts of Mr. Johns Hopkins when laying his plans for his great endowments."[16]

In summary, John Work Garrett is the primary source for establishing George Peabody's influence on Johns Hopkins and this influence has been affirmed by men close to both philanthropists and their benefactions. The writer of Dr. Joseph Parrish's obituary is the only source for the statement that Dr. Parrish provided Johns Hopkins with "the embryonic creation" of The Johns Hopkins University. John C. French has fully described the circumstances of Dr. Patrick Macaulay's influence on Johns Hopkins.

Later evidence may further verify these influences and perhaps uncover others. Yet in the final analysis, Johns Hopkins determined in his own mind to use his wealth for humanitarian purposes and clearly instructed his trustees how best to put it to the most fruitful use.

[13] John C. French, "Mr. Johns Hopkins and Dr. Macaulay's 'Medical Improvement,'" *Bull. Hist. Med.*, 1953, *27*: 562-566.
[14] *Ibid.*, p. 565.
[15] *Ibid.*, p. 562.
[16] *Ibid.*, p. 565.

THE WILLIAM OSLER MEDAL ESSAY

ANTYLLUS AND HIS MEDICAL WORKS *

RICHARD L. GRANT

INTRODUCTION

Textbooks in the field of the history of medicine are replete with the names of personages whose works have persisted far beyond their own time to become part of the vast storehouse of knowledge to which we are heir. Whether intrinsic worth or simple fortuity is the basis for the preservation of their works is open to speculation. The important fact is that these authors and their thoughts are the better known because of the persistence of their works. Yet there are others, probably equally endowed but certainly less fortunate, whose original works are no longer in existence. Some of these still enjoy, however, relative degrees of renown because of the accuracy, originality, or uniqueness of their material. This is mainly made possible by the efforts of those to whom there fell the role of being encyclopedians. To these compilers we owe a debt of gratitude for preserving for us much of the thought of the sages of antiquity which would otherwise be lost. Just such a sage is Antyllus, a man "celebrated even among his contemporaries as a physician and surgeon of uncommon worth." [1]

Despite all that we may learn of the works of Antyllus, nothing is known of his life. He is variously described by Allbutt as "that imposing surgical phantom" [2] and "that evasive shade, without local habitation." [3] In fact, works eventually ascribed to the name of Antyllus have been published under such variants as: Antylus, Antilis, Antylis, Antyles,[4]

* This is a shortened and revised version of the essay submitted for the Osler Medal under the title, "Antyllus, his works, and the medicine of his day." To Dr. Ilza Veith, I wish to express my deepest appreciation and gratitude for her guidance and encouragement in the preparation of the original essay. I wish also to thank the librarians of the various University of Chicago libraries for their kind assistance, and, for technical assistance, I thank Susan J. Grant.

[1] Arturo Castiglioni, *A History of Medicine*. New York: Alfred A. Knopf, 2nd ed., 1958, p. 247.

[2] Clifford T. Allbutt, *Greek Medicine in Rome*. London: Macmillan and Co., 1921, p. 273.

[3] *Ibid.*, p. 285.

[4] Dezeimeris, Ollivier, et Raige-Delorme, *Dictionnaire historique de la médecine*. Paris: Béchet Jeune, 1828-39, vol. I, p. 142.

Antyllos,[5] and even Ancilisius.[6] There is no question that these names all refer to the same person whom we shall call Antyllus, in deference to popular usage, although the most correct would be the Greek rendition, Antyllos, for classical Greek was the vehicle by means of which his works have made their journey to more modern times.

Antyllus' Chronological Placement and the Life of a Physician at this Time

The question of the temporal localization of Antyllus has been subject to widely varying solutions. Some authors have attempted to fix the time of his life simply as sometime before that of Oribasius of Pergamum (325-403),[7] the physician and friend of the Emperor Julian and our main source for the works of Antyllus. Haeser states that Antyllus lived in the fourth century A. D.[8] This statement would place him almost coeval with Oribasius and is probably mistaken. The greater weight of evidence, as presented by the medical historians whose works were used as sources for this treatise, favors the second century A. D. as more likely than the third century A. D. Some writers conspicuously omit any mention of Antyllus altogether [9, 10, 11, 12] or of the dates of his life.[13, 14]

Those authors who propose the third century as the time when Antyllus flourished merely state this without attempting to offer any evidence on behalf of their assertion,[15, 16, 17, 18, 19, 20] whereas, with those

[5] Max Neuburger, *History of Medicine*. London: Oxford University Press, 1910, vol. I, p. 229.

[6] Francis Adams, *The Seven Books of Paulus Aegineta, Translated from the Greek, with a Commentary*. London: Sydenham Society, 1844-47, vol. II, pp. 298, 303.

[7] Castiglioni, *op. cit.*, p. 250.

[8] H. Haeser, *Geschichte der Medicin*. Jena: Mauke, 2nd ed., 1853.

[9] Charles Singer, *A Short History of Medicine*. New York: Oxford University Press, 1928.

[10] Victor Robinson, *Pathfinders in Medicine*. New York: Medical Review of Reviews, 1912.

[11] Karl Sudhoff, *Essays in the History of Medicine*, translated by Fielding H. Garrison. New York: Medical Life Press, 1926.

[12] Logan Clendening, *Source Book of Medical History*. New York: Paul B. Hoeber, 1942.

[13] Albert H. Buck, *The Growth of Medicine from the Earliest Times to About 1800*. New Haven: Yale University Press, 1917.

[14] Charles Greene Cumston, *An Introduction to the History of Medicine*. London: Kegan, Paul, Trench, and Trubner and Co., 1926.

[15] Richard A. Leonardo, *Lives of Master Surgeons*. New York: Froben Press, Inc., 1948, pp. 15-16.

[16] Roswell Park, *An Epitome of the History of Medicine*. Philadelphia: F. A. Davis Co., 1902, p. 51.

who suggest the second century, some attempt is usually made to present plausible rationale for their choice. Neuburger [21] places Antyllus anterior to Galen (130-200 A. D.) and after Archigenes of Apameia (48-117 A. D.),[22] Heliodorus (first century A. D.),[23] and Leonidas of Alexandria (first century A. D.).[24] Antyllus is said by Hamilton to have lived during the reign of Trajan (98-117 A. D.).[25] Hamilton also places Heliodorus contemporaneously with Antyllus [26] and Sprengel puts Heliodorus and Trajan at the same time.[27] Mettler states that Antyllus flourished about 140 A. D. but mistakenly asserts this date to be after Galen.[28] Garrison places him contemporaneously with Galen.[29] Sprengel [30] and Castiglioni [31] simply state that Antyllus lived in the same century as Heliodorus. Both Neuburger [32] and Allbutt [33] place Antyllus anterior to Galen by contending that Galen quoted from Antyllus, but Neuburger does not document his statement. Dezeimeris similarly places Antyllus before Galen by stating:

> On croit qu'il appartenait a la secte méthodique, et qu'il a été, par conséquent, antérieur a Galien, puisque cette secte c'est éteinte vers le temps ou vécut ce dernier. Toutefois, s'il en était ainsi, il y aurait lieu de s'étonner que Galien n'en ait fait aucune mention.[34]

As will be discussed later, Dezeimeris probably was mistaken in consign-

[17] E. Gurlt, *Geschichte der Chirurgie*. Berlin: Hirschwald, 1898, vol. I, pp. 474-86.

[18] Edward Berdoe, *The Origin and Growth of the Healing Art*. London: Sonnenschein, 1893.

[19] Joh. Hermann Baas, *Outlines of the History of Medicine*, translated by H. E. Handerson. New York: Vail, 1889, p. 177.

[20] Richard J. Dunglison, *History of Medicine*. Philadelphia: Lindsay and Blakiston, 1872, p. 169.

[21] Neuburger, *op. cit.*, vol. I, p. 274.

[22] Leonardo, *op. cit.*, p. 18.

[23] Cecelia C. Mettler, *History of Medicine*. Philadelphia: The Blakiston Co., 1947, p. 808.

[24] Neuburger, *op. cit.*, vol. I, p. 229.

[25] William Hamilton, *The History of Medicine, Surgery and Anatomy*. London: Henry Colburn and Richard Bentley, 1831, vol. I, p. 118.

[26] *Ibid.*

[27] Kurt Sprengel, *Histoire de la médecine*, translated by A. J. L. Jourdan. Paris: Deterville, Desoer, 1815, vol. II, p. 91.

[28] Mettler, *op. cit.*, p. 820.

[29] Fielding H. Garrison, *An Introduction to the History of Medicine*. Philadelphia: W. B. Saunders Co., 1917, p. 94.

[30] Sprengel, *op. cit.*, vol. II, p. 92.

[31] Castiglioni, *op. cit.*, p. 247.

[32] Neuburger, *op. cit.*, vol. I, p. 274.

[33] Allbutt, *op. cit.*, p. 275.

[34] Dezeimeris, *op. cit.*, vol. I, p. 142.

ing Antyllus to the Methodist sect. Considering Galen's apparent propensity for plagiarism, discussed by Allbutt,[35] it would not be as astonishing as Dezeimeris stated for Antyllus to have antedated Galen and still be unknown by name in Galen's works. Indirectly, even Osler places Antyllus in about the first century by referring to his works as coming "through the mists of 18 centuries. . . ." [36] Neuburger claims, but does not document, that Antyllus quotes Archigenes.[37] This credit to Archigenes in the works of Antyllus is discovered in *Oeuvres D'Oribase* translated by Daremberg.[38] This fact places Antyllus after or contemporaneously with Archigenes.

From this vast array of sometimes contradictory opinions it is not possible to draw a categorical conclusion concerning when Antyllus lived. He probably preceded Galen and just as probably followed Archigenes. It is most likely that Antyllus was alive during the reign of Trajan (98-117 A. D.) and most certainly during that of Hadrian (117-138 A. D.).

It is difficult even to speculate on the life of Antyllus. We do not know his place of birth, nor do we know where he spent his life in the practice of medicine and surgery. How Antyllus obtained his education is likewise unknown, but because of the considerable influence of previous thought on his works, and because of the impact of his works on subsequent authors, it is probable that Antyllus was schooled in Rome and lived part of his life, at least, in close proximity to it. Any definitive proof of this has yet to be discovered. His wide experience was perhaps obtained during a tenure as public physician in one of the larger cities, an appointment which would have been earned for him by his unusual ability and great resourcefulness, or perhaps as a court physician. It could be that he obtained some of his surgical training while serving as an army physician, or even at a gymnasium or at the arena.

Antyllus' Medical Philosophy

About the time of Antyllus, there were two major medical schools, Pneumatism and Methodism, and two less important ones, Dogmatism and Empiricism. There were also physicians whose thought was eclectic in nature and who by some have been placed into a formalized school, and by others into a combined Pneumatic-Eclectic school.

[35] Allbutt, *op. cit.*, p. 275.
[36] Sir William Osler, "Remarks on arterio-venous aneurysm." *Lancet*, 1915, I: 949.
[37] Neuburger, *op. cit.*, vol. I, p. 274.
[38] Oribasius, *Oeuvres d'Oribase*, translated by Bussemaker and Daremberg. Paris: Imprimerie Nationale, 1851-74, vol. II, p. 334.

It may be possible to achieve a greater degree of certainty with regard to the medical philosophy of Antyllus than is possible concerning his life and times with only the works which are available to us. Indeed, this may be accomplished in spite of the loss of two-thirds of the works of Oribasius,[39] who is our main source for Antyllus' writings.

Where have the various authors placed Antyllus? As ever, there exists discord. Only the ideas of those authors who do not merely mention Antyllus, but who attempt also to name the school to which he belonged, will be considered.

Buck [40] and Dezeimeris [41] place Antyllus in the Methodist school but make no attempt to explain their rationale in relation to this choice. Sprengel [42] mentions his name in relation to the Methodist sect only in a restricted fashion. He says that Antyllus explained the effect of different temperatures of air on the body after the manner of the Methodists, and also that, according to the same precepts, Antyllus discussed the influence of a stay in high, mountainous places and in low marshy places. It is probably not fair, from these statements, to assume that Sprengel thought Antyllus was a Methodist, but this is the only sect that Sprengel mentions.

Dunglison, nonspecifically, includes Antyllus among "several other physicians and surgeons of the pneumatic and eclectic schools." [43] Oribasius occasionally gives dual credit in several of his chapters to Herodotus and Antyllus or to Heliodorus and Antyllus, indicating the similarity of the medical philosophies of these men.[44] Garrison [45] names Antyllus, Archigenes, and Heliodorus as three Pneumatist surgeons. Castiglioni states that Antyllus was the inspiration of the two surgeons of the Pneumatic school, Archigenes and Heliodorus, inferring that it was to this school that Antyllus belonged.[46] The temporal relations of Antyllus and these two latter surgeons as stated by Castiglioni is probably the reverse of the actual situation, as was shown previously (p. 157). Neuburger states:

> The pneumatic school also attained considerable distinction in surgery, the most renowned surgeons of the imperial age belonging to it—Archigenes, Leonides and Heliodorus, as well as the later Antyllus.[47]

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[39] Allbutt, *op. cit.*, p. 277.
[40] Buck, *op. cit.*, p. 143.
[41] Dezeimeris, *op. cit.*, vol. I, p. 142.
[42] Sprengel, *op. cit.*, vol. II, p. 93.
[43] Dunglison, *op. cit.*, p. 169.
[44] Oribasius, *op. cit.*, vol. III, pp. 570, 615.
[45] Garrison, *op. cit.*, p. 94.
[46] Castiglioni, *op. cit.*, p. 247.
[47] Neuburger, *op. cit.*, vol. I, p. 229.

Leonardo concurs with this conclusion and names the same three men.[48] Neuburger further says: "Antyllus adhered for the most part to the principles of the pneumatic school." [49] The inferred meaning of this latter statement is clearly stated by Gurlt [50] who says that Antyllus was not of any school, but rather that he took from the Methodists, Pneumatists, and others only that which proved useful, thus ascribing a truly eclectic nature to Antyllus' medical philosophy. Perhaps even Sprengel's stand may be interpreted to read that Antyllus took certain principles from the Methodists while extracting other principles from other sources.

Can these polemics be settled? Yes, but not by quoting further sources, who may, as those quoted, merely take a stand without holding a brief for their position. Rather, Antyllus himself, in his works, gives us certain clues.

Innumerable references containing the catch words or phrases of the doctrine of humoral pathology, such as: "evacuate plethora," "thickening of humors," "dissipates humors," "fluxion," "excessive moisture," "attenuating matter," etc., bespeak his basic reliance on this doctrine. By this it may be assumed that the Methodists' repudiation of humoral pathology did not serve as one Antyllus' basic tenets.

This would be fine except that under seven different subjects in his works, as found in Oribasius, Antyllus mentions or alludes to "the pores," i. e.:

> The localities bordering the sea are propitious for hydropics and for the sick ones troubled by any fluxion whatsoever, or at a time when it is necessary to excite, to warm up or to open the pores. . . .[51]
>
> We rub the skin . . . to open the pores.[52]
>
> Among the medicaments which staunch the blood, some arrest hemorrhages . . . because they close the pores. . . .[53]
>
> . . . it is necessary to . . . arrest the blood flow . . . with the aid of astringents which stop the pores. . . .[54]
>
> [abstinence] appeases pain . . . caused by arrest of the plethora in the pores.[55]

and indirectly, "baths tighten and cool, . . ." [56] and "artificial baths are prepared . . . for making tighter (constricting) . . ." [57] and lastly, "sleep relaxes that which is constricted." [58] How else can this be thought

[48] Leonardo, *op. cit.*, p. 16.
[49] Neuburger, *op. cit.*, vol. I, p. 244.
[50] Gurlt, *op. cit.*, vol. I, pp. 474-86.
[51] Oribasius, *op. cit.*, vol. II, p. 301.
[52] *Ibid.*, p. 429.
[53] *Ibid.*, p. 430.
[54] *Ibid.*, p. 72.
[55] *Ibid.*, vol. I, p. 439.
[56] *Ibid.*, vol. II, p. 382.
[57] *Ibid.*, p. 380, parentheses added.
[58] *Ibid.*, vol. I, p. 444.

of than as showing the direct influence of the Methodist school in at least these parts of Antyllus' works?

Under only three subjects are references made to the pneuma by Antyllus:

. . . or we wish to excite and reinforce the pneuma throughout the whole body. . . .[59]

. . . therapeutic walking displaces the pneuma and restores the normal state. . . ."[60]

. . for those in whom the pneuma is tediously and with difficulty set into movement. . . ."[60]

Walks on the plain . . . restore the pneuma as well as the body more easily to its natural state.[60]

Walks in the morning . . . attenuate the pneuma.[60]

walking . . . fortifies the pneuma. . . .[61]

In these brief references the general aim is seen to be a reinforcing or restoration of the pneuma when it is in an abnormal state. Just such an abnormal state of the pneuma, for the Pneumatists, constituted disease. This speaks for the derivation from Pneumatist doctrines of a certain amount of Antyllus' concept of pathology and the structure of the human body.

No conclusive evidence is provided by noting the physicians whom Antyllus quotes in his works, for these number only three, with but one reference each: Archigenes,[62] Hippocrates,[63] and Timocratus.[64] Of Timocratus nothing is known except that he probably preceded Antyllus, since his name is in Antyllus' works. He is also quoted by Oribasius,[65] indicating that Oribasius had access to his works in the fourth century (or at least to works, other than Antyllus', in which Timocratus was mentioned). Of the other two physicians quoted by Antyllus, Hippocrates is often quoted by almost all of the physicians of times later than his own, so this is of little help. With Archigenes, the smallest of clues is given. This savant belonged either to the Pneumatic or Eclectic-Pneumatic school and immediately preceded Antyllus (*see* p. 157 above). From this meager and circumstantial evidence, it is possible only to make a guided guess that Archigenes' thought and medical philosophy exerted a significant influence on that of Antyllus.

In an attempt to draw from the preceding array of evidence that which is our goal, namely, to know to which school Antyllus belonged, it

[59] *Ibid.*, vol. II, p. 452.
[60] *Ibid.*, vol. I, pp. 503-11.
[61] *Ibid.*, p. 534.
[62] *Ibid.*, vol. II, p. 337.
[63] *Ibid.*, vol. I, p. 527.
[64] *Ibid.*, vol. V, p. 92.
[65] *Ibid.*, vol. II, p. 194.

will be best to think of the major medical thought of Antyllus' time as being part of a continuum and as constantly undergoing change. There was a blending of Pneumatist, Methodist, and Empiricist doctrines into a sagacious school of Eclecticism. Allbutt states that this fusion of doctrines " was eminently the work of Archigenes." [66] It is this eclecticism which is shown in Antyllus' works in the use of Methodist technical words such as " pores " in combination with humoral pathology and the " pneuma " theory of the Pneumatic school. Antyllus' therapeutics is a combination of all those methods which proved useful, regardless of their source. The difficulty which the historians herein quoted had in ascribing Antyllus to a particular sect lends further credence to the eclectic nature of his works. If Archigenes was the most eminent in this eclectic method, surely his successor was Antyllus. Only Gurlt among the sources investigated reached this same conclusion.[67]

Works of Antyllus

None of the original works of Antyllus are in existence as far as is known. They certainly existed until the time of Paulus of Aegina in the seventh century A. D. and perhaps even as far as the tenth century, when Rhazes quotes Antyllus. From this time onward, however, credit is given to Antyllus only via the writings of Oribasius, Stobaeus, Aetius, Paulus of Aegina, Avicenna, Rhazes, and Nicetas.[68] The most inclusive source is the compilation by Oribasius. I made use of the 1851 French translation by Bussemaker and Daremberg of the Greek text of Oribasius, supplemented by selected parts of the writings of Antyllus found in Paulus of Aegina, translated by Francis Adams. The commentaries in the latter work proved invaluable in comparing Antyllus' contributions with the thought of other ancient authors. The works of Herodotus, Archigenes, and Posidonius are also recorded by Oribasius. The original works of these physicians, like those of Antyllus, are entirely lost.[69]

A word should be said concerning Antyllus' originality. We have no reason to assume that Antyllus was any more conscientious in quoting his sources than any other of the ancient authors. Allbutt states that such imposing figures of natural genius as Soranus and Galen " plundered largely, literally, and anonymously." [70] It is not surprising, therefore,

[66] Allbutt, *op. cit.*, p. 272.
[67] Gurlt, *op. cit.*, vol. I, pp. 474-86.
[68] Dezeimeris, *op. cit.*, vol. I, p. 142.
[69] P. V. Remouard, *Histoire de la médecine.* Paris: Baillière, 1846.
[70] Allbutt, *op. cit.*, p. 273.

that many of the passages from Antyllus resemble the works of previous authors, just as the works of some authors after Antyllus resemble his works. The works of Antyllus which have been deemed original by posterity will be indicated as they are outlined.

From the fragments available it may be seen that Antyllus wrote at least two major treatises. The first, the name of which comes to us through Oribasius, is called *On the Methods of Treatment*. This work consisted of four books. The first "treats of exterior or topical agents," the second "of methods for evacuation," the third "of what is given to sick people," and the fourth "of what the patient himself does to promote health." The second major treatise is a surgical work which outlines in great detail various procedures for surgical cure and treatment of several afflictions. In these two works Antyllus deals with nutrition, hygiene, exercise, gymnastics, drinks, evacuations, airs and places, topical and external medicaments, balneology, tumors (swellings), urology, herniae, and ophthalmology.

The manner in which Antyllus treats these subjects leads us to assume that he was a physican and surgeon of vast experience. By comparing Antyllus' works to those works of other physicians of the time which have come down to us in more complete and perhaps original form, there will be noted wide gaps in the subject matter of Antyllus' available fragments. There are no works on gynecology or obstetrics, dermatology, fevers, trauma, anatomy, pathology, physiology, and mental and nervous disease, except as some of these subjects are mentioned in passing in the works already indicated. The more likely explanation for this lack may be that the works are lost and not that Antyllus did not write them.

We will now turn to the works themselves. Because the volume of Antyllus' works far exceeds the limitations of this treatise, no attempt will be made to present them *in toto*. Antyllus is, of course, best known, and often quoted, as a surgical author. For this reason the surgical aspect of his work is here dealt with only briefly; main emphasis will be placed on the comparatively little-known medical works. The surgical topics with which he dealt include: abscesses,[71] aneurysms,[72] cataract,[73, 74, 75, 76, 77] catheterisms,[78] colobomata,[79] contracture,[80] cynanche,[81] dropsy,[82] ectro-

[71] Oribasius, *op. cit.*, vol. III, p. 570.
[72] *Ibid.*, vol. IV, p. 52.
[73] Hamilton, *op. cit.*, vol. I, p. 118.
[74] Gurlt, *op. cit.*, vol. I, pp. 474-86.
[75] Park, *op. cit.*, p. 51.
[76] Garrison, *op. cit.*, p. 95.
[77] Adams, *op. cit.*, vol. II, p. 282.
[78] *Ibid.*, p. 353.
[79] Oribasius, *op. cit.*, vol. IV, p. 56.
[80] *Ibid.*, p. 22.
[81] Adams, *op. cit.*, vol. II, p. 303.
[82] *Ibid.*, p. 340.

pion,[83] fistulae,[84] ganglion,[85] hernia,[86] hydatids,[87] hydrocephalus,[88] hypospadias,[89] indurated tonsils,[90] laryngotomy,[91] lithiasis,[92] male breasts resembling female breasts,[93] phimosis,[94] pterygia,[95] short prepuce,[96] and steatomata.[97] Of all these, his treatment of cataract was probably the most important.

Osler said that Antyllus was

> one of the most daring and accomplished surgeons of all time . . . a resector of bones and joints, one of the first to perform tracheotomy, the founder of the surgery of fistula, a successful operator upon cataract, and we may say the creator of the surgery of the arteries.[98]

It is usually only in this division of a well-rounded physician's work, surgery, that Antyllus is credited with originality and insight which was in advance of his day. Because of the purely technical nature of Antyllus' surgical chapters, humoral pathology plays less of a part than in his other works. It was this fact, as much as any other, which made his surgical works of such value to later physicians and created his reputation as a skillful and experienced surgeon. He was free, to a greater extent, to depend on and learn from observation and study, and he had less rigorously formalized thought with which to contend while attempting to analyze and categorize his ideas and findings and put them into use.

Of Antyllus' medical work, *On the Methods of Treatment,* the names of all the chapters will be listed, in order to demonstrate the wide range of subjects in the surviving fragments.

Book One of the Work, *On the Methods of Treatment*

The first book of *On the Methods of Treatment* is concerned with topical agents and other external influences on the health of a patient. This book is the largest of those which remain for us. The order in which the various subjects appear does not represent the order in which they occur in Antyllus' original works, as that order is unknown.

In speaking of airs and winds, Antyllus writes three chapters: "On the monthly difference of the air," [99] "On the daily difference of the

[83] *Ibid.*, p. 267.
[84] Oribasius, *op. cit.*, vol. III, pp. 611, 615.
[85] *Ibid.*, vol. IV, p. 16.
[86] Adams, *op. cit.*, vol. II, p. 337.
[87] *Ibid.*, p. 272.
[88] Oribasius, *op. cit.*, vol. IV, p. 200.
[89] *Ibid.*, p. 463.
[90] Adams, *op. cit.*, vol. II, p. 298.
[91] *Ibid.*, p. 303.
[92] *Ibid.*, p. 361.
[93] *Ibid.*, p. 335.
[94] Oribasius, *op. cit.*, vol. IV, p. 466.
[95] Adams, *op. cit.*, vol. II, p. 415.
[96] Oribasius, *op. cit.*, vol. IV, p. 460.
[97] *Ibid.*, p. 3.
[98] Osler, *op. cit.*, p. 949.
[99] Oribasius, *op. cit.*, vol. II, p. 287.

air," [100] and "On winds." [101] Just as the year is divided into seasons, so Antyllus divides months and days into four parts which resemble the four seasons in the year. The moon produces the monthly changes. Identical effects are given rise to by corresponding seasons of the year, month, and day. Winds are divided into those limited to a particular country and those which are generally distributed. Galen is given credit by Adams, in his commentary on Paulus, for several of the statements found in these chapters of Antyllus.[102]

As in all the chapters of this book, Antyllus utilizes the theories of the humoral pathology doctrine to explain the beneficial effects of the various recommendations which he makes. It is in this book that Antyllus' theory of pathology may best be seen. His best description of true pathology and pathologic anatomy is, however, to be found in his surgical works.

Other chapters concerned with spatial concepts in relation to disease are: "On places," [103] "On the sick room," [104] and "On the place of repose." [105] These chapters as well as almost all the others in this book were discussed by many of the authors of antiquity.

Subjects closely related to present day nursing care as well as the practice of medicine are Antyllus' chapters: "On embrocations," [106] "On affusions and on the usage of sponges and of lotions," [107] and "On poultices." [108]

Baths received careful consideration. Antyllus wrote "On artificial baths" [109] and "On natural mineral baths." [110] According to Adams, Hippocrates was the first author to mention waters having the ingredients of which Antyllus speaks, but Hippocrates spoke unfavorably of them.[111] Like Antyllus, Asclepiades advocated the use of the bath in many illnesses.[112] The chapter in Paulus "On the natural baths" is said by Adams to be taken from Oribasius.[113] Adams is correct but did not mention the further fact that Oribasius' chapter was taken from Antyllus, according to Daremberg's manuscript. Paulus' chapter and that of Antyllus are practically identical in wording.

Antyllus' chapters "On pitch plaster," [114] "On sinapism," [115] "On the

[100] *Ibid.*, vol. II, p. 289.
[101] *Ibid.*, p. 298.
[102] Adams, *op. cit.*, vol. I, p. 64.
[103] Oribasius, *op. cit.*, vol. II, p. 301.
[104] *Ibid.*, p. 307.
[105] *Ibid.*, p. 309.
[106] *Ibid.*, p. 332.
[107] *Ibid.*, p. 334.
[108] *Ibid.*, p. 337.
[109] *Ibid.*, p. 380.
[110] *Ibid.*, p. 383.
[111] Adams, *op. cit.*, vol. I, p. 72.
[112] *Ibid.*, p. 71.
[113] *Ibid.*
[114] Oribasius, *op. cit.*, vol. II, p. 409.
[115] *Ibid.*, p. 410.

cooking of medicaments which are put into plasters," [116] and "On unguents" [117] were commented on by Sprengel in these terms: "Not a single person, among the ancients, left, on the preparation of plasters and unguents, precepts as sage as Antyllus." [118] The chapter "On the cooking of medicaments which are put into plasters" is found complete in the works of Paulus as well as those of Oribasius.[119] An additional chapter by Paulus, "On restorative ointments (acopa), liniments, calefacient plasters (dropaces) and sinapisms," [120] contains passages on sinapisms which closely resemble Antyllus' chapter on this subject. This, in all probability, indicates that Paulus did not always acknowledge indebtedness to his various sources, although several of his other chapters are written under Antyllus' name.

That Antyllus was original on the subject of sinapisms is unlikely. Adams, in his commentaries on Paulus, states: "Aetius, upon the authority of Archigenes details its (sinapism) medicinal properties in nearly the same terms (as Antyllus)." [121] Antyllus is no doubt greatly indebted to Archigenes and others of the Pneumatic or Eclectic sect who preceded him for this and other parts of his writings.

The chapters "On fumigation" [122] and "On medicaments which are inhaled" [123] both give in great detail the procedures and compounds to be used. Hysterical suffocation was particularly amenable to treatment by either of these methods, but a number of other afflictions, such as: migraine, epilepsy, asthma, orthopnea, and others, also were recommended for treatment of this type by Antyllus.

Antyllus divided hemostatic substances into five categories in "On hemostatic medicaments." [124] This division is based on the method by which the different substances arrest hemorrhage.

> . . . some arrest hemorrhages by their cooling properties, others by their astringency, others because they close the pores, others by their dessicating property, others finally by scalding.[125]

Antyllus lists the ingredients in each of these categories and describes their method of application.

Concerning Antyllus' long chapter, "On collyria," [126] several preparatory comments should be made. According to Adams, "the ancients used

[116] *Ibid.*, vol. V, p. 87.
[117] *Ibid.*, vol. II, p. 443.
[118] Sprengel, *op. cit.*, vol. II, p. 93.
[119] Adams, *op. cit.*, vol. III, pp. 572-5.
[120] *Ibid.*, p. 581.
[121] *Ibid.*, p. 588, parentheses added.
[122] Oribasius, *op. cit.*, vol. II, p. 424.
[123] *Ibid.*, p. 428.
[124] *Ibid.*, p. 430.
[125] *Ibid.*
[126] *Ibid.*, p. 432.

the word (collyria) in a more general signification than the moderns do." [127] He quotes a passage from Le Clerc describing the various species of collyria. The ancients used collyria not only for the eyes, but also for the uterus and fistulae. Antyllus best describes their use by saying:

> collyria proper are applied to the eyes, . . . whereas those which are called compound collyria are either applied against organs, or introduced into cavities, and they are applied against the uterus and introduced into fistulae and purulent foci.[128]

Antyllus wisely suggests certain precautions in the compounding and administration of collyria. His descriptions engender the impression that Antyllus was intimately familiar with his subject. His perspicacity is dulled only when he speaks of the adverse influence of certain meteorological conditions on the efficacy of treatment with collyria.

Adams feels that Paulus' chapter "On collyria and agglutinative applications" is taken mostly from Galen.[129] A comparison of Antyllus' account and that of Paulus shows remarkable resemblances, resemblances that almost surely indicate that Paulus' account, at least in part, follows that of Antyllus. Many possibilities exist to explain this. Paulus as well as Galen may have had access to Antyllus' works, and both then wrote from Antyllus. This would explain Adams' statement. More simply, Galen may have used Antyllus' works without giving credit to him, and Paulus then used Galen's works. Perhaps Antyllus and Galen had a common source who remains unknown to us at present. It may be easily seen that these do not exhaust the various possibilities. These speculations are made to point up the lack of knowledge which exists about the origins and sources of medical ideas. Similar examples of the confusion on sources will be set forth concerning other of Antyllus' chapters.

As with collyrium, troche (trochisks, pastilles) meant to the ancients something different than what it means in modern times. In the chapter "On troches" [130] Antyllus says that there are three kinds: those that are drunk, those that are injected, and those in the form of an unguent. The first type he describes in his passages "on agents administered to the interior." In this chapter, "On troches," he is only concerned with the last two. Here again a remarkable resemblance may be seen between various passages in Antyllus and in Paulus' chapter "On trochisks, or troches." [131] It is likely that Antyllus' works, through whatever route,

[127] Adams, *op. cit.*, vol. III, p. 556, parentheses added.
[128] Oribasius, *op. cit.*, vol. II, p. 432.
[129] Adams, *op. cit.*, vol. III, p. 548.
[130] Oribasius, *op. cit.*, vol. II, p. 438.
[131] Adams, *op. cit.*, vol. III, p. 528.

found their way into Paulus' writings, sometimes under Antyllus' name, and often under the names of others.

The next chapter in Book One, " On pessaries," is found complete both in Oribasius [182] and Paulus.[183] The pessaries of the ancients differ from modern pessaries.

> Those of the ancients were medicated ointments or liniments, which were generally applied to the natural parts upon wool, most commonly for the purpose of correcting the menstrual discharge.[184]

Antyllus described three varieties of pessaries according to their properties. Some of the pessaries soften, others are astringent, while still others have diuretic properties. As ever, when medicaments are placed in a natural or pathological orifice, Antyllus wisely advises the inclusion of a thread with which to extract the pessary. This attention to small details is one of the factors which show Antyllus to be a wise and experienced physician.

In a short chapter " On injections " [185] our author describes injections into the vagina and into the uterus. He does not list any of the ingredients to be used, however. Antyllus alludes to a special instrument designed for injecting liquids into the uterus but does not describe it.

Indications for the application of unguents are treated exhaustively in the chapter " On unguents." [186] Unguents, or ointments, are used on parts of the body which do not lend themselves to the application of embrocations or cataplasms. Antyllus gives many clinical indications for the use of unguents and names many diverse ingredients to be used.

In the chapter " On malagmata " [187] Antyllus describes three principal varieties of malagmata or emollient plasters: those consisting of dry ingredients, such as roots, herbs, and grains, those made of mineral substances, and those consisting of natural or artificial juices, fat, and other substances capable of being melted. The preparation of malagmata is also described here with the exception of that of malagmata of mineral or fusible substances which is contained in the chapter on plasters. Antyllus states that the preparation of malagmata is treated by all the other authors. Adams speaks of Antyllus' account of malagmata in his commentary on Paulus but gives credit for it to Oribasius.[188] Celsus and Galen both gave full accounts of malagmata as well as most of the other topics in this first book.

[182] Oribasius, *op. cit.*, vol. II, p. 441.
[183] Adams, *op. cit.*, vol. III, p. 602.
[184] *Ibid.*, p. 603.
[185] Oribasius, *op. cit.*, vol. II, p. 442.
[186] *Ibid.*, p. 443.
[187] *Ibid.*, p. 448.
[188] Adams, *op. cit.*, vol. III, p. 581.

Antyllus' next chapter is "On acopic medicaments."[139] Acopa are restorative ointments:

> . . . originally used as soothing applications to parts which were pained from severe exertion, they came afterwards to be applied for various other purposes, as for removing all deep seated pains, indurations, contractions, and the like.[140]

Antyllus states that acopa are of three types: warming, softening, and irritating. In other chapters he indicates what ingredients are to be used in the preparation of acopa.

Sternutatories are extensively described by our author in "On sternutatories."[141] Antyllus himself best describes the indications for their use:

> We make use of sternutatories, either when we propose to awaken sick ones plunged into a profound sleep, or to arouse the attention of an intellect suffering from delirium, or when we wish to expel a fetus, or after childbirth, or to make evident the point of an arrow hidden in the chest, or to cause the cessation of hiccoughs, or expel objects fallen into the eyes, or to eradicate and help some chronic malady of the head or to reinforce the pneuma . . . either locally [or] throughout the whole body, as in paralysis, apoplexy and epilepsy.[142]

Sternutatories are advised only after the ordinary methods of evacuation of humors have been tried. The sternutatory is applied with the end of a moistened feather. Antyllus indicates what ingredients are to be used.

Antyllus differentiates between the topics of his next three chapters, "On empasms,"[143] "On cataplasms,"[144] and "On Diapasms"[145] (these medicaments are called abstergents or smegmata by Adams),[146] by saying:

> . . . empasms are medicaments which are employed against excessive perspiration, or against some other transpiration, or to stimulate the skin and produce smarting. Cataplasms are medicaments with which ulcers are sprinkled and diapasms are preparations suitable for giving a good odor to the body, either in general, or to some of its parts, such as the axilla, or the inner sides of the thighs.[147]

The extensiveness of Antyllus' pharmacopeia is shown, in part, by the number of ingredients to which he refers in these three chapters.

In the next chapter, "On salves,"[148] Antyllus treats of a compound, somewhat oily, medicament applied to the external orifices of the body, such as the ears, nose, mouth, breech, and urinary meatus. This category

[139] Oribasius, *op. cit.*, vol. II, p. 450.
[140] Adams, *op. cit.*, vol. III, p. 586.
[141] Oribasius, *op. cit.*, vol. II, p. 451.
[142] *Ibid.*
[143] *Ibid.*, p. 454.
[144] *Ibid.*, p. 455.
[145] *Ibid.*, p. 456.
[146] Adams, *op. cit.*, vol. III, p. 536.
[147] Oribasius, *op. cit.*, vol. II, p. 454.
[148] *Ibid.*, p. 456.

of treatment is not mentioned in such a manner in Paulus or any other of the sources utilized.

Antyllus' remaining chapters in the first book are: "On ingredients for rubbing the skin," [149] "On medicaments for the ears," [150] and "On medicaments for the teeth." [151] These are all treated with his customary thoroughness.

Book Two of the Work, *On the Methods of Treatment*

Antyllus' second book, *On the Methods of Depletion* (*Evacuation*) may roughly be divided into two parts. The first part, composed of some nine chapters, exhaustively discusses the subject of bleeding. The second part contains eight chapters on a variety of methods for ridding the body of excessive humors. Indirectly, Oribasius, by utilizing Antyllus' works, indicates that he considers the latter's treatment on bleeding to have been the best available to him. Paulus takes part of his section "On venesection" [152] from Antyllus and also mentions his name. Adams in his commentary on Paulus quotes from Antyllus, as found in Oribasius,[153] on this subject.

Antyllus begins his section on bleeding by discussing in detail "Which are the vessels which ought to be opened in the various parts of the body." [154] He cautions against thrombosis of a vessel and against incising blindly for a vessel when one is not apparent.

In "What must be done before letting blood," [155] Antyllus knowingly advised the use of a tourniquet above the site of incision on an extremity. He recognized that

> . . . never, on any part, will the band (tourniquet) cause the swelling of a vessel when it is placed below it [156]

and

> to apply heat before hand with sponges to the arm produces no effect, for the vessels do not swell with any other method than the application of a band.[157]

A faint flicker of the idea of the circulation of the blood may be seen here, perhaps only in retrospect, however.

The next chapter, "How bleeding must be done," [158] is brief and gives

[149] *Ibid.*, p. 429.
[150] *Ibid.*, p. 459.
[151] *Ibid.*, p. 460.
[152] Adams, *op. cit.*, vol. II, p. 317.
[153] *Ibid.*, p. 321.
[154] Oribasius, *op. cit.*, vol. II, p. 38.
[155] *Ibid.*, p. 44.
[156] *Ibid.*, parentheses added.
[157] *Ibid.*
[158] *Ibid.*, p. 47.

instructions for the actual cutting into the vein. Instructions for the size and shape of the incision, plus some of the indications for bleeding, are given in " When bleeding must be executed " and " What the size and form of the incision should be." [159] If the flow of blood slows or halts, Antyllus tells " Which maneuvers must be employed in order to facilitate flowing of blood." [160] It is interesting that Antyllus recommends the application of bands to the extremities in the case of fainting due to bleeding. This corresponds to the present day application of tourniquets to the limbs in case of hypovolemic shock.

Antyllus writes one chapter " On arterial bleeding," [161] but this is merely a technical chapter, and no indications for arterial bleeding are given. It is the arteries of the head which are used, and of the blood which comes from these arteries, Antyllus says:

> . . . the blood is not mingled with much air either, for these arteries resemble the nature of veins; whence it results that the depletion from this place is not much better than ordinary blood-letting.[162]

The remaining chapters which deal with bleeding are " On cupping glasses," [163] " On scarification," [164] and two chapters " On leeches," [165, 166] the second being taken from Oribasius' *Synopsis* and probably a paraphrase of Antyllus' work.

Paulus' chapter " On cupping " [167] has many similarities to Antyllus' work and, in common with several chapters previously mentioned, probably was taken from him. Adams gives Oribasius credit for this chapter: " Oribasius is the ancient author who discusses this subject at the greatest length, and to him Paulus is principally indebted." [168] According to Daremberg, Oribasius gives credit to Antyllus for this work. In his chapter, Antyllus discusses indications, preparations, and procedures. He describes three materials of which cupping glasses are made—glass, horn, and bronze—and the attributes of each. In those made of horn, the vacuum is created by suction through the smaller end with the lungs rather than with heating. Scarification is treated of and used, both with cupping and alone.

Paulus did not write a chapter expressly on leeches. Adams comments that Albucasis and Rhazes speak of leeches, as did Galen.[169] Antyllus'

[159] *Ibid.*, p. 48.
[160] *Ibid.*, p. 50.
[161] *Ibid.*, p. 55.
[162] *Ibid.*
[163] *Ibid.*, p. 58.
[164] *Ibid.*, p. 63.
[165] *Ibid.*, p. 69.
[166] *Ibid.*, vol. V, p. 21.
[167] Adams, *op. cit.*, vol. II, p. 324.
[168] *Ibid.*, p. 326.
[169] *Ibid.*, pp. 326-7.

account is extensive. It should be mentioned that he clearly preceded all the forementioned authors. He recommends that the leechs' tails be cut off, if there is only a small number of them, for in this manner they will not become satiated and will continue to suck.

The remaining chapters in the second book, *On the Methods of Depletion,* are concerned with the various methods used by the ancients to evacuate excessive humors. " On ellebore " [170] is a short chapter extolling the properties of this popular ancient emetic and cathartic. Antyllus is quoted by Paulus concerning a prescription, containing ellebore, injected into the rectum to produce purging by vomiting.[171] A suppository of ellebore was originated by Antyllus.[172] In his commentary on Paulus, Adams discusses Oribasius' account of ellebore as " the fullest and most accurate account on the subject." [173] Adams says that Oribasius drew from Archigenes, Herodotus, and Antyllus.

The other chapters are: " On masticatories," [174] " On errhines," [175] " On lacrymatory medicaments," [176] " On diuretics," [177] " On hemogogic medicaments," [178] and " On sudorifics." [179] With the exception of the chapter on lacrymatories, these chapters are found in almost the same form in Paulus and are credited to Oribasius by Adams.[180] They are unfortunately abridged and therefore lose a measure of Antyllus' completeness when read from Paulus.

Although no chapter on purgatives remains, Aetius mentions that Antyllus

> espouses the theory which maintains the specific operation of purgatives and that they act by attracting the humors to which they are allied.[181]

Book Three of the Work, *On the Methods of Treatment*

We have only three chapters from Antyllus' third book which is concerned with " that which is given to sick people." These are: " The nourishment of those who are habitually ill, and the manner of preparing it," [182] " On collutories," [183] and " On drink." [184]

The first chapter gives details for the preparation of various simple

[170] Oribasius, *op. cit.*, vol. II, p. 167.
[171] Adams, *op. cit.*, vol. III, p. 505.
[172] *Ibid.*, p. 506.
[173] *Ibid.*, p. 507.
[174] Oribasius, *op. cit.*, vol. II, p. 183.
[175] *Ibid.*, p. 187.
[176] *Ibid.*, p. 188.
[177] *Ibid.*, p. 189.
[178] *Ibid.*
[179] *Ibid.*, p. 190.
[180] Adams, *op. cit.*, vol. I, pp. 54, 59, 60, 61, etc.
[181] *Ibid.*, vol. III, p. 486.
[182] Oribasius, *op. cit.*, vol. I, p. 300.
[183] *Ibid.*, p. 413.
[184] *Ibid.*, p. 414.

foods and indicates when these foods should be taken. Honied water or hydromel is mentioned as a nutrient. Antyllus recommends collutories, or mouth-washes, in all stages of illnesses except the onset and praises their virtues. As for the various substances given to the patient to drink, Antyllus speaks of these as counteracting the noxious influences under which the body may have fallen, either by the ingestion of a poison or in some other way.

Book Four of the Work, *On the Methods of Treatment*

The fourth book is concerned with "what the patient himself does to promote health" and treats mainly of exercises. This is probably one of the most complete discourses on the subject to come down to us from the ancients.

The first nine chapters are not concerned with bodily exercise as are the remaining fourteen chapters. The titles of the first nine chapters are: "On retiring," [185] "On repose," [186] "On abstinence," [187] "On the usefulness of sleep," [188] "On wakefulness," [189] "On discourse" (vociferation),[190] two chapters "On declamation," [191, 192] one from Oribasius' *Synopsis* and "Which is the best method of declamation." [193] To obtain a full measure of the knowledge of Antyllus, these, as well as the rest of his chapters, should be read in full.

In these chapters Antyllus describes the indications for each of the procedures of which he speaks and also describes the effect of their utilization. He does this in the familiar terms of humoral pathology. True to his eclectic nature, he adds a small part of the Methodist theory of pores and the status of the pores in relation to disease, which he considers to be of value. Antyllus' chapter on wakefulness differs considerably from Paulus' chapter.[194] To Antyllus wakefulness is a desirable state under certain conditions which he enumerated. Paulus, on the other hand, talks of wakefulness (or watchfulness) as one of the deplorable sequelae of disease. Antyllus shows how to obtain wakefulness and Paulus how to treat and remove it. Paulus' chapter "On vociferation, or the exercise of the voice" is said by Adams to be not as comprehensive as that of Antyllus.[195] It is likely that Antyllus' chapter on vociferation also served as the basis for Aetíus' chapter because of the resemblance noted between

[186] *Ibid.*, p. 436.
[187] *Ibid.*, p. 438.
[188] *Ibid.*, p. 439.
[189] *Ibid.*, p. 444.
[190] *Ibid.*, p. 446.
[191] *Ibid.*, p. 448.
[192] *Ibid.*
[193] *Ibid.*, vol. V, p. 7.
[194] *Ibid.*, vol. I, p. 451.
[195] Adams, *op. cit.*, vol. I, pp. 181-2.
[196] *Ibid.*, p. 30.

the wording of Aetius as paraphrased by Adams and the wording of Antyllus.[196]

Antyllus' chapters on exercise concern fourteen different types of physical exercise almost all of which are mentioned in Adams' commentary on Paulus' chapter "On the kinds of exercise," but they are not mentioned by Paulus who devotes only this one short general chapter to this subject.[197] These exercises were discussed by many ancient authors, and undoubtedly none of the exercises originated with Antyllus. However, Hamilton states:

> Among the fragments of Antyllus, preserved by Oribasius, we find many varieties of exercises unnoticed in the works of Galen or of others.[198]

The chapters are: "On walking," [199] "On running," [200] "On passive movement," [201] "On equitation" [202] "On exercise with the hoop," [203] "On swimming," [204] "On sham combat," [205] "On gesticulation," [206] "On hopping and skipping," [207] "On handball," [208] "On *corycos*," [209] "On the manner of pushing dumb-bells," [210] "On walking on uneven terrain," [211] and "On *combat en armes*." [212]

The Greek title of the chapter on sham combat was translated by Adams as "fighting with one's own shadow." [213] The exercise with the *corycos* or leather bag is performed with the bag filled with flour or sand and suspended by a rope from the ceiling. The bag is then pushed this way and that. This exercise was discussed by Hippocrates.[214] Hamilton says, of exercise with the hoop, that it is

> an exercise, the nature of which, from its long disuse, even Mercurialis, who has treated the subject of gymnastics with so much ability, does not attempt to explain.[215]

(Daremberg says that Hippocrates spoke of it.)[216] From this we have meager evidence that Antyllus, while probably not original, was at least thorough in his discussion of exercises.

[196] *Ibid.*
[197] *Ibid.*, pp. 22-3.
[198] Hamilton, *op. cit.*, vol. I, p. 161.
[199] Oribasius, *op. cit.*, vol. I, p. 503.
[200] *Ibid.*, p. 511.
[201] *Ibid.*, p. 513.
[202] *Ibid.*, p. 519.
[203] *Ibid.*, p. 521.
[204] *Ibid.*, p. 523.
[205] *Ibid.*, p. 525.
[206] *Ibid.*, p. 526.
[207] *Ibid.*
[208] *Ibid.*, p. 528.
[209] *Ibid.*, p. 531.
[210] *Ibid.*, p. 532.
[211] *Ibid.*, p. 534.
[212] *Ibid.*
[213] Adams, *op. cit.*, vol. I, p. 23.
[214] *Ibid.*, p. 24.
[215] Hamilton, *op. cit.*, vol. I, p. 161.
[216] Oribasius, *op. cit.*, vol. I, p. 662.

Antyllus' chapters on exercise are oriented more toward the use of exercise in afflicted people than in healthy ones, but he tells of the benefits which accrue from their prophylactic use. The views of Antyllus on exercise reflect his belief in the doctrine of humoral pathology.

Because this is, in part, a biographical study, perhaps it should end with a description of Antyllus' last days and give the cause of his demise. These details are, however, unknown and may forever remain so. A comment on the importance of his niche in the hall of medical history is more fitting.

The true effect of all of Antyllus' writings cannot be ascertained. If it were possible to apply a measurable scale to the effect of the writings of Oribasius, Aetius, Rhazes, and those others to whom Antyllus contributed, on later ages and to measure the extent of Antyllus' contributions to these writers, then, perhaps, the question could be answered. Short of this, one can only speculate that the effect was probably greater than is commonly appreciated.

THE DEVELOPMENT OF THE KNOWLEDGE OF KIDNEY FUNCTION IN RELATION TO STRUCTURE— MALPIGHI TO BOWMAN *

L. G. WILSON

One of the fundamental advances in anatomy in the seventeenth century was the interpretation of the structure and action of the different great visceral organs—the pancreas, liver, and kidneys—as those peculiar to secreting glands. This interpretation depended not only on the discovery of their ducts and something of their microscopic structure, but also on a comparison of these large viscera with the salivary glands. In 1642 Wirsung had discovered the pancreatic duct, and in 1656 Thomas Wharton in his *Adenographia* described the duct of the submaxillary gland but thought that the saliva, which he stated correctly was secreted through this duct, was derived from the juice of the nerves, the *succus nerveus*, not from the circulating blood. In 1661 Nicolaus Steno discovered the duct of the parotid gland and, influenced by the distinction of his teacher Franciscus Sylvius between conglobate glands, for example the lymphatics, and conglomerate glands such as the pancreas and the salivary glands, decided that since the pancreas and the submaxillary and parotid glands had ducts and were secretory, therefore all conglomerate glands must have ducts and be secretory. On this basis he sought for and found the ducts of the sublingual gland, the buccal glands and the lacrymal glands. Steno also recognized that the secreted fluid in each case is derived from the circulating blood brought to the gland by the arteries.[1] The bringing together of this broad range of different body fluids to have a common origin in the circulating blood is an illustration of the sweeping effect of the theory of the circulation on physiology and of the way in which it undermined humoral concepts. For the idea of humors rested on the idea that each body fluid was an independent existence.

From ancient times the kidneys had been known as the source of the urine. Galen had shown not only that the urine originates in the kidneys, but that the flow of urine along the ureters into the bladder is irreversible.[2]

* Read at the thirty-second annual meeting of the American Association for the History of Medicine, Cleveland, Ohio, May 21, 1959.

[1] Sir Michael Foster: *Lectures on the History of Physiology*. Cambridge: University Press, 1901, pp. 103-108.

[2] Galen: *On the Natural Faculties*. Trans. by A. J. Brock, London: Heinemann, 1916, pp. 55-61.

In 1662, Lorenzo Bellini had shown that the kidneys are not, as had been thought, mere flesh (*caro*) similar to liver, spleen, or muscle, but are made up of minute ducts radiating outward from the pelvis to the outer border of the kidney. He says:

> The common opinion is that the kidneys are made up of a hard, solid fleshy substance with no fibres or with only a few interwoven. However, the state of affairs is otherwise, for the substance of the kidneys is nothing else than an aggregate of an infinite number of vessels of a kind peculiar to itself. Having cut through any part of the kidney, certain fibres or filaments extending from the outer surface to the hollow or pelvis are quite plainly visible. . . .[3]

He then shows that these tubules are the passages through which the urine is secreted.

> If, therefore, you compress these filaments from their further end, that is, with respect to the pelvis, and examine them, you will find water welling up everywhere. If you are not afraid to present this to your tongue you will discover a certain saltiness and in some, the taste of urine. . . .
>
> From these things we can definitely infer that the substance of the kidneys, even though they have called it parenchyma, is nothing else than a mass of canaliculae and capillary spaces through which the urine flows into the pelvis.[4]

Bellini found the source of the secreted urine in the circulating blood arriving in the arteries and suggested that the urine was separated from the arterial blood by a mechanical means, based on a difference in size between the particles of urine and those of venous blood. He supposed that the branches of the arteries empty their blood into small spaces and that these spaces are drained by two kinds of vessels—on the one hand the veins, which are of a size appropriate to receive the particles of venous blood, on the other hand, the urinary tubules, which are of such size as to be able to receive only the particles of urine. He says:

> When, therefore, the blood emerges from the arteries it comes in contact with two classes of vessels, namely, on the one hand venous vessels, on the other renal vessels. Therefore, the serum enters the renal ducts, separated from the blood, and the blood enters the veins separated from the serous humor.
>
> But this secretion occurs neither by attraction nor by familiarity, nor by sympathy, but is accomplished solely by the configuration of the vessels producing it.[5]

In this last sentence we have an eloquent statement of the mechanical spirit of seventeenth century physiology.

[3] Lorenzo Bellini: *De structura et usu renum*. Leyden, 1711, p. 19.
[4] *Ibid.*, p. 21.
[5] *Ibid.*, p. 23.

Thus when, in 1666, Malpighi came to study the liver and the kidneys, he was prepared to find that they were comparable to conglomerate glands in their structure and derived their secretion from the circulating blood. He began his study of the kidney with an examination of the tubules of Bellini and showed that the kidney in larger mammals is a compound structure made up of distinct masses of Bellini's tubules, each mass shaped in the form of a many-sided pyramid. The apex of each pyramid terminates inwardly in a papilla. The tubules converge toward this papilla and open in it. Malpighi also noticed that in the outer part of the kidney, in the cortex, the tubules are not straight and fibrous, but twisted and membranous. He says:

> For it is indeed certain that there are present in this outermost part small canals, observed elsewhere to be almost innumerable, which are not at all fleshy but membranous and seem to conform both in substance and function with the other excretory vessels *such as the salivary and biliary ones.*[6]

Thus he feels that he has found the kidney to be comparable to a secreting gland not only in its general structure and function, but also in the most exact microscopic details.

Malpighi then announces his great discovery in the kidney, his observations of bodies which were long called Malpighian bodies, but which are now generally referred to as *glomeruli.*

> For in single kidneys . . . a production of very minute glandules was detected, and it was my good fortune to observe this invariably in quadrupeds, tortoises and man himself. . . . A black liquor mixed with spirit of wine must be injected through the renal artery so that the whole kidney will swell and will be blackened outwardly. . . . When this same kidney has been cut through its length, between the fascicles of urine vessels and also arising in the interspaces you will observe almost countless numbers of these bodies which are attached like apples to blood vessels, swollen with black liquid and produced in the form of a kind of tree.[7]

Of the individual glandule he says:

> . . . they seem like the eggs of fishes, and when a black liquid is propelled through the arteries they are blackened, and you would say that they have surrounded the uttermost off-shoots of the vessels like serpents proceeding up a column, so that they appear as if haloed, but with this condition that especially the part which is attached to the branch of an artery blackens, while the remainder retains its own colour.[8]

The afferent arteriole, as it enters the glomerulus, branches repeatedly

[6] Marcello Malpighi: *Opera omnia.* 2 vols., Leyden, 1687, vol. 2, p. 281: italics mine.
[7] *Ibid.*, p. 283.
[8] *Ibid.*

into as many as fifty capillaries which descend into loops, with a slight spiral twist. If the descending limbs of these loops were blackened, while the ascending limbs remained clear, the ascending limbs might very well look like a snake coiling up around the dark column formed by the descending limbs.

Malpighi was not able to demonstrate a continuity between any one of these glandules and a urinary tubule, but he argued on functional and comparative grounds that such a continuity must exist:

> . . . for if in the liver, brain, and in other glandules, it is always true that any single *acinus* or globule produces its own excretory branch, in addition to arteries and veins, the same must also be said with regard to glandular bodies of this kind. . . . since it may be established from the facts induced above that the tips of the arteries open very abundantly into these glandules, and that urine is eliminated into the pelvis through the fibres of the kidneys, as if through its proper excretory vessels, it must necessarily be acknowledged that a contiguity and common path exists between them.[9]

This continuity between the glomerulus or Malpighian body and the urinary tubule was only clearly demonstrated by William Bowman in 1842. Ruysch had examined the Malpighian bodies, but was misled by his discovery that the Malpighian body was essentially a tangled mass of blood vessels. By his very success in the difficult technique of anatomical injection Ruysch had been led to conclude that all tissues were simply masses of fine blood vessels, and he disagreed with Malpighi's concept of glands, as made up of *acini* of secreting tissue, each supplied with blood vessels but having in addition distinctive glandular tissue. Ruysch's heresies are indicative of how, in the eighteenth century, the method of anatomical injections displaced the microscopic methods of the seventeenth century. The long hiatus in the study of microscopic anatomy between Malpighi and Bowman may, I think, be attributed to the direction of effort almost entirely towards the perfection of techniques of anatomical injection.[10]

Ruysch was also misled by the fact that his injection material extravasated out of the capillaries of the Malpighian body and passed along the urinary tubules to the pelvis. He says:

> When I fill the renal artery with red wax, at the same time the urinary ducts of Bellini are also filled, and this circumstance must give me doubts concerning

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[9] *Ibid.*

[10] The preoccupation of eighteenth century anatomists with anatomical injections is clearly presented in F. J. Cole: "The history of anatomical injections," in Charles Singer: *Studies in the History and Method of Science.* 2 vols., Oxford: Clarendon Press, vol. 2, 1921, pp. 285-343.

the existence of glandules in the human kidneys. Certainly in animals I not infrequently observe round bodies resembling myriads of glandules, but they are few, and I have not persuaded myself that these corpuscles are true glandules intended for the secretion of urine . . . but on the other hand the tips of the blood vessels are very wonderfully twisted and coiled.[11]

From this observation Ruysch inferred that the fine branches of the renal artery were directly connected by open mouths with the urinary tubules, and this view prevailed through the eighteenth century. Such "exhalant" arterioles were thought to be involved in all glandular secretion.[12]

Ruysch seems, however, to have done a real service in showing that the Malpighian body was in fact a tangled mass of blood vessels and in giving it the name *glomus,* meaning a ball of yarn, later reduced to *glomerulus arteriarum* meaning "a little tangled ball of arteries."

In 1782 Schumlansky seems to have arrived at essentially correct views regarding the anatomical relations of the Malpighian body or glomerulus and the urinary tubules but was unable to convince his contemporaries.[13] In 1828 Huschke and in 1830 Müller, in a general reaction against ideas of glandular secretion based upon the concept of "exhalant arteries," denied any direct connection between the Malpighian body and the urinary tubules.[14] They supposed that the Malpighian bodies lay embedded among the tubules but unconnected with them.

This was the position then when Bowman began his studies on the kidney around 1840. William Bowman, at the age of twenty-four, was Assistant Surgeon to the newly founded King's College Hospital. His scientific work was to be principally crowded into the years 1840-1847, and later his time was entirely taken up by the practice of ophthalmology. Like Malpighi and Müller he had entered upon the study of the kidney as an outgrowth of previous studies on secreting glands. Bowman noted that the urinary tubules in the kidney cortex were lined with an epithelium which impressed him, as it had Malpighi, by its similarity to glandular epithelium. Outside this epithelium he saw a transparent homogeneous sheath enclosing the tubule and called by him the *basement membrane.* Moreover he noted that each Malpighian body was surrounded by a cyst or capsule of material exactly similar to the basement membrane. From

[11] Frederick Ruysch. *Thesaurus anatomicus, tertius.* Amsterdam, 1703, p. 39 [my trans.].

[12] Johannes Müller: *De glandularum secernentium structura penitiori.* Leipzig, 1830, pp. 10, 11.

[13] A. Schumlansky: *De structura renum.* Strasbourg, 1782.

[14] Emil Huschke: "Ueber die Textur der Nieren," Oken's *Isis,* 1828, Bd. XXI, col. 560-572. Johannes Müller, *op. cit.*

this similarity Bowman guessed that the capsule was merely the basement membrane of the urinary tubule expanded over the Malpighian body, but he was at first unable to support this conjecture with evidence. However, through Dr. Milne Edwards, he learned of a new injection technique developed by Doyère in Paris—the successive injection into an organ of solutions of potassium chromate and lead acetate which meet in the vessels to give a yellow precipitate of lead chromate.[15] Bowman injected these substances through the renal artery into the kidney of horse and found that while in some cases the injection material had remained within the glomerulus, in others it had burst out into the capsule and had passed off along the urinary tubule, thereby demonstrating the continuity of the capsule with the tubule.

In the capsule and just within the mouth of the tubule Bowman was able to discover ciliary motion in live kidney tissue. He also noted that the efferent arteriole, emerging from the capsule, broke up into a capillary plexus spread out over the surface of the uriniferous tube, and he compared this second capillary system to the portal system of the liver. In the *Boa constrictor* he found that the efferent arterioles anastomosed with the branches of the renal portal vein, " so the portal system of the kidney in the lower tribes, has a two-fold origin, one extraneous, the other in the organ itself." [16] Thus at one stroke Bowman revealed the whole complicated plan of the renal circulation substantially as we know it today.

In considering the mode of function of this microscopic structure Bowman was equally astute. He tentatively suggested that the Malpighian bodies serve to separate the watery portion of the urine from the blood. The arrangement of the blood vessels in the Malpighian tuft appeared designed to retard the flow of blood.

> The vessels in which this delay occurs are uncovered by any structure. They lie bare in a cell from which there is but one outlet, the orifice of the tube. This orifice is encircled by cilia, in active motion, directing a current towards the tube. These exquisite organs . . . must tend to remove pressure from the free surface of the vessels, and so to encourage the escape of their more fluid contents.[17]

The special features which adapt the glomerulus and capsule to their function of filtration could scarcely be better set forth. Bowman thought

[15] W. Bowman: "On the structure and use of the Malpighian bodies of the kidney with observations on the circulation through that gland." *Phil. Trans. Roy. Soc. Lond.*, 1842, pp. 57-80. *See also* L. Doyère and A. de Quatrefages: "Sur les capillaires sanguins." *Extaraits des procès-erbaux des séances de la Société Philomatique de Paris*, 1841.

[16] Bowman, *op. cit.*, p. 65.

[17] *Ibid.*, p. 75.

that the urea was secreted into this watery portion by the epithelium lining the tubules, on the ground of its resemblance to glandular epithelium.[18]

In comparing the work of Malpighi and Bowman, divided by almost two centuries, we note certain features in common. Both men used techniques of injection as opposed to modern techniques of fixing, embedding, sectioning, and staining; both used injection methods to reveal microscopic structure and did not regard injection as an end in itself, as so many had done in the long barren interval in kidney physiology between them. Finally both men based their ideas of the kidney's function on inferences drawn from their detailed observations of structure, their direct knowledge of the kidney's functon being limited to the fact that it received blood and excreted urine, yet their conclusions were astonishingly accurate.

[18] *Ibid.*

MEDICO-HISTORICAL NEWS AND ACTIVITIES

ANNOUNCEMENTS

AMERICAN ASSOCIATION FOR THE HISTORY OF MEDICINE, INC.

The thirty-third annual meeting of the A.A.H.M. was held at Charleston, S. C., on March 24, 25, and 26, 1960. Pending the report of the meeting by the Secretary-Treasurer of the Association, the following transactions are reported here:

Elections

Chauncey D. Leake, President; Lloyd G. Stevenson, Vice-President; Whitfield J. Bell, Jr., Robert Moes, J. Frederick Smithcors, G. Kasten Tallmadge, members of the Council to hold office for three years.

Awards

The William H. Welch Medal was awarded to Richard Harrison Shryock "for his continuing contributions to our understanding of the economic, social, and cultural influences on medical knowledge and practice, particularly for his history of the *National Tuberculosis Association* (1957) and his *History of Nursing* (1959)."

Since the deadline for the Osler Medal essays is April 1, 1960, no recommendation could be made at the time of the meeting.

Membership Dues

Beginning with 1961, the dues of the Association will be raised to the following schedule:

Active Members, regular dues	$ 7.50
Contributing Members	15.00
Sustaining Members	50.00
Nonresident Members	7.50
Constituent Societies	10.00

Amendment

Article X, section 5, of the Bylaws has been amended to read: "The President and Vice-President in consultation with the Secretary shall appoint one or more committees to arrange the program and other activities of those annual meetings for which the Council has designated a place and year."

Advisory Editorial Board of the Bulletin

Dr. Genevieve Miller was appointed to the Advisory Editorial Board of the *Bulletin of the History of Medicine* in place of the late Dr. Wyndham B. Blanton.

Annual Meetings

As previously announced, the thirty-fourth annual meeting will be held in Chicago, May 18-20, 1961.

The thirty-fifth annual meeting will be held in 1962 in Los Angeles, California.

NATIONAL NEWS

American Academy of the History of Dentistry

The annual meeting of the A.A.H.D. will be held on October 14, 1960, at the Biltmore Hotel, Los Angeles, California.

Ancient and Accepted Scottish Rite of Freemasonry

The Supreme Council of the Ancient and Accepted Scottish Rite of Freemasonry, Southern Jurisdiction, U. S. A., has printed separately a chapter of the projected history of the Supreme Council from 1801 to the present time. The aim of this publication, *Eleven Gentlemen of Charleston*, is to "invite and encourage the contribution of additional material from those who may have anything of importance to add." The eleven Founders concerned are: Colonel John Mitchell, Reverend Frederick Dalcho M. D., Comte Alexandre François Auguste de Grasse, Jean Baptiste Marie Delahogue, Major Thomas Bartholomew Bowen, Rabbi Abraham Alexander, Emanuel de la Motta, Issac Auld, M. D., Israel de Lieben, Moses Clava Levy, James Moultrie, M. D.

International College of Surgeons

The sixth of the fourth series of lectures on the History of Surgery is scheduled for March 15, 1960: The lecturer will be Dr. Leo Zimmerman; subject, "The History of Blood Transfusion."

University of Kansas School of Medicine

The tenth Logan Clendening Lecture will be delivered by Dr. J. B. de C. M. Saunders on March 21, 1960. The title of his lecture will be: "The Transitions from Ancient Egyptian to Greek Medicine."

The history of medicine museum currently features an exhibit of stamps commemorating doctors, nurses, and scientists.

Dr. L. C. R. Agnew, chairman of the history of medicine, spoke on the "History of Pathology" at the University of Maryland School of Medicine, January 16, 1960.

Yale University

Yale University has announced the creation of a department of the history of science and medicine to supersede the present department of the history of medicine. Beginning September 1960, the new department, under the chairmanship of John F. Fulton and with Derek J. de Solla Price as professor in the history of science and curator of scientific instruments, will offer both undergraduate and graduate courses and will be affiliated with both the School of Medicine and the Yale Graduate School.

PROGRAMS OF MEETINGS

Benjamin Waterhouse Medical History Society

March 20, 1960: "An American Impression of British Medical Education," Fred A. Rundlett; "A British Impression of United States Medical Education," Ian Tyson.

April 25, 1960: "A Physician as a True Highwayman," Lawrence R. Dame.

Beaumont Medical Club (Yale)

December 4, 1959: Beaumont Lecture, "On the Origin of Language in Man," Macdonald Critchley.

February 19, 1960: "Contributions to Medicine by General Practitioners," William C. Gibson; "The Grenfell Medical Mission in Newfoundland and Labrador," Charles S. Curtis.

College of Physicians of Philadelphia

February 16, 1960: "The History of Tetralogy of Fallot," Helen B. Taussig.

Society of Medical History of Chicago

April 13, 1960: "Harvey Cushing—Surgeon and Teacher," Joseph P. Evans; "Oscar Pfister: A Study in Psychoanalysis and Religion," E. Alan Richardson.

NEWS FROM ABROAD

International Congress of the History of Medicine

For general information concerning the Seventeenth International Congress of the History of Medicine, *see* this *Bulletin*, January-February 1960, p. 84. We are now able to add the following details: The tentative program envisages an itinerary including visits to Crete, Rhodes, and Cos by steamer leaving, and returning to, Athens.

Members of the International Society are urgently requested to forward their dues for 1959 (200 Belgian francs) and 1960 (200 Belgian francs) to: C. CH. Postaux 565 de la Banque de Bruxelles, 25 rue Vital Decoster, Louvain, Belgium, to the account L/00/1880 of Dr. Sondervorst. Members of the A.A.H.M. may request membership in the International Society, sending $5 to cover the 1960 dues to the above account.

Registration fees, to be sent to the President of the Congress, Prof. Sp. Oeconomos, 3, rue Grivéon, Athens, Greece: $10 for non-members of the International Society, $8 for members, $5 for persons accompanying them.

For hotels, the boat, etc., enquiries should be addressed to the Wagons-Lits Cook agency which is taking complete care of the material organization of the Congress.

Subjects of papers and a brief résumé, the whole not to exceed 10 pages of double-spaced typing, must be sent to the Secretariat of the Congress before June 15, 1960. See former announcement for address and subjects to be discussed.

Germany

Professor Georg Sticker, Emeritus-Professor of the History of Medicine at Würzburg and well-known for his research on epidemiology and the history of epidemic diseases, will celebrate his hundredth birthday on April 18, 1960.

Professor Martin Müller, Emeritus-Professor of the History of Medicine at Munich and a former non-resident member of the American Association for the History of Medicine, died on January 14, 1960.

BOOK REVIEWS

D. P. WALKER. *Spiritual and Demonic Magic from Ficino to Campanella.* Studies of the Warburg Institute edited by G. Bing, vol. 22. London: The Warburg Institute, University of London, 1958, vi + 244 pp. £2.

This book traces the history of a tradition of Neoplatonic magic through a century and a half, from Ficino's *De Triplici Vita* (1489) to the writings of Campanella in the 1620's and 1630's. Besides Ficino and Campanella, some twenty-five authors of the period are dealt with, including fierce opponents of the practice of magic like Johann Wier and Thomas Erastus, as well as more or less ardent advocates of it in one form or another. The 16th century was, in fact, a heyday for magic; the 16th century writings on magical theories form a very considerable and very difficult literature. The present study provides a series of stepping stones through a tangled garden.

Walker distinguishes two kinds of magic, one called spiritual or natural, the other called demonic. In spiritual or natural magic, the medium of transmission of effects is "spirit," that is, the *spiritus mundi* of the Platonists and Stoics, and the human spirit which is akin to it. "Spirit" here is generally conceived as something lower than rational intellect, a kind of mean between body and soul. Planetary influences are transmitted by the cosmic spirit to the operator's spirit and imagination; the forces of images, words, music, and talismans are used as aids to heighten the effect or as ways of communicating it. In demonic magic, on the contrary, angels or demons are substituted for the impersonal, "spiritual," planetary influences. The demons are attracted or compelled by the various forces and then accomplish effects, acting not only on the body and spirit but also on the higher parts of the soul.

Natural magic tended to become indistinguishable from other activities, art, science, practical psychology, or religion. Thus for Pomponazzi the theories of natural magic provided explanations in terms of "natural" causes of effects which were popularly attributed to demonic or angelic agency; his *De Incantationibus* is intended to justify an Aristotelian disbelief in direct divine or demonic action in the world. Natural magic could also turn into music and poetry, as with La Boderie; into orthodox Christianity, as with Giorgi; into unorthodox Christianity, as with Persio. Demonic magic, on the other hand, led to the reckless heresies of Agrippa and Paracelsus. The two kinds of magic were united in Ficino, at the beginning of the period, and came together again in Campanella, at its close.

Ficino's magic was essentially a private affair, aimed at rendering the human spirit "as celestial as possible," and more particularly, as solarian as possible. Ficino plays a lute which is decorated with a picture of Orpheus charming animals, trees, and rocks; he sings an Orphic hymn to the sun, burns frankincense, drinks wine, contemplates a talisman; in daytime he is in sunlight, at night he represents the sun by fire. He is, in fact, performing an unorthodox religious rite which is intended to have effects solely on the operator, enabling him, by a transformation of the spirit, "to measure and grasp the whole world."

The magic of the *De Triplici Vita* is ostensibly non-demonic; but demonic elements are present, though camouflaged. Other writings of Ficino, as well as those of his disciple Diacceto, give more direct evidence of his belief in and practice of demonic magic. Throughout the period which Walker's study covers, the discussion of magic turns in part upon the recognition that demonic magic is both un-Christian and anti-Aristotelian.

Among the 16th century writers whose theories Walker summarizes are Trithemius, Agrippa, Paracelsus, Gohory, Giorgi, Tyard, La Boderie, Paolini, Champier, Lefèvre d'Etaples, G. F. Pico, Jean Bodin, Del Rio, Telesio, Donio, and Persio. Walker is mainly concerned with direct Ficinian influence, or with the continued discussion of Ficinian themes.

In Campanella, Ficinian magical rites are put to the service of public, practical ends of the vastest scope. Believing that the end of the world was being announced by the approach of the sun to the earth and by such heavenly and earthly catastrophes as the Protestant heresies, the Nova of 1572, and the discovery of America, Campanella hoped in the time remaining to transform Catholicism and to convert and unite all the religions and nations of the world. It was by magic, largely taken from Ficino, although modified by elements of a materialistic Telesian cosmology, that he hoped to acquire the power to enforce this conversion, by gaining the support and confidence of the Pope, the King of France, or Richelieu. And in the case of Urban VIII, he came very near to success.

Walker's study shows careful scholarship and reflective analysis. It is a valuable contribution to the history of 16th century magic and cosmology.

CURTIS WILSON

LAWRENCE BABB. *Sanity in Bedlam.* A study of Robert Burton's *Anatomy of Melancholy.* East Lansing: The Michigan State University Press, 1959. xi + 116 pp. $5.00.

All will agree that a book, and the only one at that, capable of drawing Samuel Johnson from his bed two hours sooner than he wished to rise must have been of peculiar interest and attraction. This unique volume was Robert Burton's *Anatomy of Melancholy,* and, in later times, its ardent admirers included Keats, Lamb, Thackeray, Byron, and Sir William Osler.

Since its publication in 1621, it has received continued, if somewhat intermittent, popularity, and although few can have emulated Johnson's enthusiasm, many of us have shared his interest. The *Anatomy* has been described as a systematic analysis of the accumulated wisdom of mankind, covering an encyclopaedic range of topics. As well as being a psychiatric treatise, dealing with a variety of mental illnesses in addition to depression, it is also a commentary on men and manners, and it reflects the interests, acquirements, and opinions of the early Stuart intellectual. Burton made use of a multitude of highly diversified sources, and the astonishing number of quotations and the innumerable references in text and marginalia are features of his work. It has been truthfully said that this would be the ideal book for a castaway on a desert island. Some critics,

however, have been less charitable in their opinions, and they complain that the author is completely obscured by his profuse borrowings. Others go further and, in their misinterpretation, describe the *Anatomy* as

> A mire ankle deep of deliberate confusion
> Made up of old jumbles of classic allusion. (Lowell)

Thus the very nature of the book makes an overall appraisal of it, and of its author, a difficult task. Much has been written concerning each, and they have provided a fertile field for literary detective work. Many have attempted to identify Burton's sources, and others have speculated on those authors who may have plagiarized him or may have been influenced by him. However, a comprehensive analysis of this classic, and of Burton's aims and purposes, by an expert in Elizabethan and Jacobean literature has so far been lacking. Mr. Lawrence Babb, Professor of English at the Michigan State University, has now made good this deficiency by providing a scholarly guide to the Burtonian labyrinths. His most important achievement is his interpretation of Burton's ideas, aims, and meanings; he is able to show that as well as being a recognized source-book, the *Anatomy* has a purposeful message for mankind, and that, as others have attested, it can be considered a serious contribution to psychiatric thought.

Mr. Babb begins with a general description of the book, and he traces its growth through the first six editions, from about 300,000 to about 490,000 words. He then gives the existing biographical information concerning Robert Burton; he does not, however, mention what is possibly his only surviving letter, which was sold in a London auction room three or four years ago. It is concluded that Burton was a sympathetic humanitarian, characterized by studiousness, piety, credulity, and moderation. He did not claim to be an original thinker, and so he selected the opinions and knowledge of others to create a palatable dish for his contemporaries. Suffering himself from melancholy, he hoped that his layman's efforts might help others similarly afflicted; he thus provides an early example of the principle inherent in such organizations as Alcoholics Anonymous.

Mr. Babb mentions Burton's more important sources and then discusses the scientific, ethical, social, metaphysical, and religious aspects of the *Anatomy*.

In the chapter on "Science," astronomy, astrology, alchemy, physics, mathematics, biology, geography, and cartography are very briefly considered, and finally the medical sources and contents are dealt with. It is estimated that less than a quarter of his whole book is concerned with medicine, physiology, psychology, and psychiatry. The medical writers drawn upon are discussed accurately, although historians would dispute the use of the term "fantastic" as applied to the theories of Galen and Paracelsus. It is interesting to remember that Burton was a contemporary of William Harvey, and although he occasionally refers to recent medical literature, he makes no mention of the *De Motu Cordis*. Furthermore he makes no reference to, and may have been unaware of, Bacon's revolutionary concepts. He lacked the experimental curiosity and critical scepticism which was becoming increasingly apparent during his life time; his medical thinking was entirely Galenic. Basically the *Anatomy* is a moral rather than a scientific work, and although there may be doubts concerning its clinical value, it expounds ethical principles and provides a moral criticism of human behavior.

Mr. Babb suggests that this, together with sympathetic counsel and consolation, is an important reason for the book's apparent immortality.

Sanity in Bedlam, which is very well written and produced, is a requisite for all who love Burton the Anatomist. We can expect that interest in the *Anatomy* will be sustained and increased by a work which lays before us the author and the essentials of his message. The Anatomist has, in his turn, been anatomized.

EDWIN CLARKE

GENEVIEVE MILLER. *The Adoption of Inoculation for Smallpox in England and France*. Philadelphia: University of Pennsylvania Press, 1957. 355 pp. Ill. $6.00.

The history of vaccination has tended to eclipse the history of variolation. In recent years this effect has been partly compensated by historians who have written on public health or on such figures as Cotton Mather. In the present volume Dr. Genevieve Miller has placed variolation at the center of interest. She has undertaken to synthesize the history of this method as it developed in England and France from the time of introduction to the time of formal adoption, the historical narrative being interpreted by frequent reference to its intellectual, social, and epidemiological background. The work is thus a history in depth as well as in detail. In the opinion of the reviewer Dr. Miller has succeeded in her difficult enterprise.

The text starts with a summary of the history of smallpox from the Middle Ages through the early eighteenth century. Dr. Miller states that in late mediaeval and early modern times "although severe epidemics of smallpox were recorded and the disease received considerable attention in medical literature, not until the seventeenth century did it begin to figure as a major hazard arousing dread and anxiety such as had been occasioned by the plague." This inference may well be correct but it should not pass unquestioned. If severe epidemics of smallpox were recorded in the earlier literature, is it reasonable to suppose that they aroused less fear than later outbreaks did? The answer may be that the earlier literature was less abundant and was a less faithful record of public sentiment and daily life than the literature of more recent times.

The text continues with an interesting chapter on the eastern origins of inoculation. It is well known that this practice came to western Europe from Constantinople. Dr. Miller shows that the technique was used in that city by Greek women and was also known or supposed to have been employed in Arabia, Circassia, and Fezzan. Perhaps future Orientalists will fill out this important part of the record.

Subsequent chapters unfold the story in England, France, and Germany. The history has a double endpoint, since inoculation was approved by the College of Physicians in 1755 and by a French military school in 1769. The closing sections of the book include an analysis of the influence of inoculation on theories of smallpox, as well as valuable historiographic, statistical, and bibliographical material. Documentation is meticulous throughout.

Dr. Miller emphasizes the fact that inoculation was an Eastern folk practice which gained its initial approval in Western Europe among the social and intellectual élite. In England acceptance was relatively prompt, whereas progress in France was somewhat slower. The innovation received much of its impetus *outside* the medical profession, i. e. in diplomatic and royal circles, among some of the clergy, and among scientists. A few revaluations emerge: the contribution of Lady Mary Wortley Montague is seen to be less important than has been supposed, that of Sir Hans Sloane is shown to be greater. Acceptance of inoculation in England is brought into relation with prevalent ideas of mercantilism and with mechanistic philosophy, while inoculation in France was favored by the *philosophes* and the *Académie des Sciences* but was retarded by the conflict between the Paris Faculty and the royal physicians, the two factions which struggled for control of French medicine.

Of special interest is the chapter which examines the effect of inoculation on the theory of smallpox. By analyzing the successive hypotheses which followed one another, like figures of a magic lantern, from the time of Rhazes to that of Angelo Gatti (1764), the indefatigable historian finds that "they can be arranged in a pattern which indicates a significant shift in emphasis as the eighteenth century progressed, a shift largely caused by the new experience with inoculation. The most simple change which can be demonstrated is that the material origin of the disease shifted from a location *inside* the body to one without, and linked with this was the increasing conviction that smallpox is a *specific* disease attributable to a specific material cause."

We may add that variolation also caused disturbances in the much wider field of general physiology. This is shown in a letter which Cadwallader Colden wrote to John Bard on July 5, 1758:

> A very small bit of thread moisten'd with the matter from the Pustule of the Small Pox, and put into a slight incision of the Arm or other part of the body produces certain and surprising changes in the Animal Oeconomy. Can any Man account on mechanical principles, why this small portion of Matter infused into the capillary Vessells lies to all appearance at rest 6 or 7 days & afterwards produces such extraordinary appearances?

The impact of variolation on medical theory is reminiscent of the shock which humoral doctrine received when mercury was shown to be efficacious against syphilis.

Since space is limited, the foregoing comments have dealt with only a few of the questions raised or answered in Dr. Miller's instructive treatise. It is important to subjoin that her book—detailed and thorough, yet broad and deep—is significant of the approaching maturity of American medical historiography.

SAUL JARCHO

ZACHARY COPE. *Florence Nightingale and the Doctors.* Philadelphia and Montreal: J. B. Lippincott Company, 1958. ix + 163 pp. Ill. $5.00.

Miss Nightingale has been so well served by her biographers—classically by Cook, modernly by Woodham-Smith, and cleverly—albeit cruelly—by Strachey—that many may have wondered if, for all practical purposes, much more remained

to be said concerning this remarkable lady. But although the title of Sir Zachary Cope's latest book *Florence Nightingale and the Doctors*, suggests a scissors-and-paste job, this uncharitable thought is immediately dispelled on reading his preface in which he states that although "a few of the letters printed in this book have already appeared in one or other of the excellent biographies of Miss Nightingale, . . . most of the extracts have never to our knowledge previously been printed." This new material is well utilized throughout the book and helps us to understand, in part at least, the often complex relationships of Miss Nightingale and members of the medical profession. It is a pity, however, that Sir Zachary has not indicated in his text the exact source of each of the letters used; the only indications given are in his introduction where several sources are listed, but throughout the book one is kept in ignorance of the current resting place of most of the letters cited.

Those who know their Cook and/or Woodham-Smith will find additional interesting sidelights on Miss Nightingale's dealings with such familiar figures as Drs. Sutherland, Bence Jones, Hall, Balfour, McNeill, Parkes, Aitken, Andrew Smith, Farr, Whitfield, Acland, and Clark. Less familiar, perhaps, are her contacts with Sir William Savory, Sir James Paget, Sir William Bowman, Dr. Elizabeth Blackwell, Dr. Pattison Walker, Sir James Y. Simpson, and Dr. Pincoffs, and these are mentioned briefly. Of particular interest to readers of the *Bulletin* is a short account of some correspondence between Miss Nightingale and John Shaw Billings concerning sketch plans of the Johns Hopkins Hospital. Dr. Billings sent her a set of plans in October, 1876, which she showed to Dr. Sutherland ("the doctor who slaved for her") who "was not favourably impressed by them"; however, Miss Nightingale apparently sent off a batch of suggestions, for in a letter dated December 4, 1876, Billings mentioned that "Your remarks shall be laid before the Trustees as soon as I return to America, and I feel quite sure that they will be very greatly interested in and influenced by your criticisms. I do not think it probable that I should do otherwise than agree with them (the suggestions)." Further, ". . . I will not attempt now to comment upon your notes, nor indeed do I think it probable that I should do otherwise than agree with them." It may well be, therefore, that Miss Nightingale played an important role in the design of the Johns Hopkins Hospital, but meantime we do not know for sure—according to Sir Zachary there is no record at Johns Hopkins of her suggestions, and the plans that Billings sent her were destroyed during World War II.

The book is well-illustrated with twelve plates and a frontispiece. There are a few minor errors in an otherwise adequate index—Miss Crossland (p 113 instead of p. 114); Sir Joseph Lister (p. 95 instead of p. 138); and Sir William Savory (pp. 137-9) does not appear at all in the index—but these are tiny flaws in an admirable addition to Nightingale knowledge.

L. R. C. Agnew

CARLOS MARTÍNEZ DURÁN. *Federico Chopin* o el triunfo del espíritu sobre la carne. Universidad de San Carlos de Guatemala Colección de Autores Guatemalenses "Carlos Wyld Ospina," Volumen Numero 2. Guatemala: Imprenta Universitaria, 1958. 266 pp. Ill.

The leitmotiv of this study of the life of Chopin is contained in the sub-title: "the triumph of the spirit over the flesh." Professor Martínez Durán poses for himself, as for all students of Chopin, the principal problem of deciding how far the composer's tuberculosis is to be considered a dominant, and indeed beneficial, influence on his music. His conclusion is that a knowledge of the dates of Chopin's compositions and of the developmental stages of his malady gives sufficient proof that the source of his works is to be sought only in his poetic soul. Only inasmuch as the bodily tragedy blights the spirit after 1837, does the disease gain some influence.

As to the diagnosis of the disease from which Chopin suffered, the author rejects the theory of the majority of his biographers, that he had tuberculous laryngitis. In this he concurs with the conclusions of Esmond R. Long. Whereas, however, Dr. Long's Logan Clendening Lecture (University of Kansas Press, 1956), uses the case of Chopin's tuberculosis as a focal point for a study of the history of the therapy of the disease from Hippocrates to modern times, Professor Martínez Durán makes of his "sentimental journey" an evocation of that poetic soul to whose music he is so devoted.

The poetic soul is something for which Professor Martínez Durán has profound sympathy, and in this book he defends with eloquence, not to say rhetoric, the most poetic of composers, defends his delicacy of feeling as well as his virility, his purity and elegance as well as his courage and nobility of spirit. In the process, he includes a passionate defence also of the much maligned figure of Georges Sand, accusing her detractors of zealous persecution and invention of evidence. It is to the care and devotion of Georges Sand that we owe Chopin's comparative well-being for many years and his consequent triumphant creativity at a time when the best of medical men could only prescribe rest and offer consolation.

The book is furnished with numerous portraits and sketches of people and places, a bibliography, and a note on the sad loss of much Chopin material, particularly correspondence and the composer's diary, in the second World War.

C. LILIAN TEMKIN

RALPH H. MAJOR. *Disease and Destiny; Logan Clendening.* (Logan Clendening Lectures on the History and Philosophy of Medicine. Eighth Series). Lawrence, Kansas: University of Kansas Press, 1958. 49 pp. Ill. $2.00.

Dr. Major's two Clendening lectures present a striking contrast to one another. In his first lecture, "Disease and Destiny," Dr. Major views the totality of human history in twenty-one pages, selecting highpoints at which a disease would seem to have affected the destiny of much of mankind. Among the highpoints are the Plague of Athens, the Antonine Plague (smallpox ?), Rome and Malaria, the

Black Death of the fourteenth and fifteenth centuries, Napoleon and typhus fever, Lenin and cerebrovascular disease. In each instance, save one, men died by the thousands and later by the millions, helpless in the presence of the great epidemics. In the last instance, Lenin's illness, Dr. Major sees millions of lives destroyed by the effect of disease upon one man's brain. In the aftermath of the great epidemics, economic, social, and religious changes ensued that have radically altered the course of human history. Today the ravaging effects of Lenin's interpretation of Karl Marx stalk the earth, the distorted product of a brain softened by arterial disease. This, in essence, is Dr. Major's thesis—presented in bold strokes—of disease and destiny.

The second lecture, "Logan Clendening," is an intimate biographical memoir. Intensely human, Logan Clendening, teacher of physical diagnosis and of medical history, was surely a lovable man. A connoisseur of fine books (especially first editions), the best foods, and good company, he radiated warmth and friendship. Where he sat was the head of the table.

Dr. Major, drawing on his long years of association with Clendening, draws a pen portrait that will give those who may never have known "Logan" a glimpse of this cultured American physician and the manner in which he expanded his initial avocation in medical history to the point where it became an integral part of the medical school curriculum. The informal photographs that illustrate this lecture will inform the reader immediately of the pleasures that must have been derived from Clendening's company. He was one of those men in medicine who are the basis of legend.

ROBERT J. FAULCONER

THE BULLETIN RECENTLY RECEIVED *

Jose F. Prieto Aguirre. *Vida y obra de Juan Mássoneau.* Salamanca, 1959, 29 pp. Ill. (Estudios de Historia de la Medicina Española, Universidad de Salamanca, nueva serie, Tomo I, Núm. 3.)

Arthur L. Bloomfield. *A Bibliography of Internal Medicine, Selected Diseases.* Chicago: The University of Chicago Press, 1960, viii + 312 pp. $6.00.

J. Menzies Campbell. "Pereda's Dental Group." Reprinted from *The Dental Magazine and Oral Topics,* June, 1959.

Carlo Castellani. *L'attività clinico-medica di Cesare Magati.* Consulti tradotti con una introduzione a cura di Carlo Castellani. Presentazione del Prof. Nicola Latronico. Milan: Stedar, 1959, 115 pp. Ill.

Carlo Castellani. *Secreti medicinali di Magistro Guasparino da Vienexia.* Antidotario inedito del XIV-XV secolo. Trascrizione e commento a cura di Carlo Castellani. Milan: Stedar, 1959, xliv + 95 pp. Ill.

Robert H. Durham. *Encyclopedia of Medical Syndromes.* New York: Paul B.

* The *Bulletin* reserves freedom of decision as to the publications to be listed in this section. Items received, other than those assigned for review, are ultimately incorporated into the collection of the Institute of the History of Medicine.

Hoeber, Inc., Medical Division of Harper & Brothers, 1960, xiv + 628 pp. $13.50.

Samuel Fastlicht. *Bibliografia odontologica Mexicana.* Mexico: La Prensa Medica Mexicana, 1954, 220 pp. Ill.

Luis S. Granjel. *Luis Lobera de Avila.* Salamanca, 1959, 43 pp. Ill. (Estudios de Historia de la Medicina Española, Universidad de Salamanca, nueva serie, Tomo I, Núm. 4.)

Ray Baker Harris. *Eleven Gentlemen of Charleston.* Washington, D. C.: [c] Supreme Council 33°, Ancient and Accepted Scottish Rite, Southern Jurisdiction, 1959, 70 pp. Ill.

R. Hoeppli. *Parasites and Parasitic Infections in Early Medicine and Science.* Singapore: University of Malaya Press, 1959, xiv + 526 pp. Ill. M $25.00.

Medical Department, United States Army. *Surgery in World War II: Neurosurgery,* Vol. II. Eds. R. Glen Spurling and Barnes Woodhall. Washington, D. C.: Office of the Surgeon General, Dept. of the Army, 1959, xxvi + 705 pp. Ill. $7.00. [For sale by the Superintendent of Documents, Washington 25, D. C.]

Ryszard Paciorkowski. Z badań nad ideą heroizmu religijnego w Chrześcijańskiej starozytności. *Collectanea Theologica.* Fasc. III—IV, 1957, pp. 503-539. (In Polish with French résumé: Contribution sur l'idée de l'héroïsme religieux dans les premiers siècles du Christianisme [En marge de la passion des Saintes Perpétue et Félicité].)

Frieda Sandwith. *Surgeon Compassionate,* The Story of Dr. William Marsden. London: Peter Davies, 1960, viii + 235 pp. Ill. 21 s.

Ursula von Schulthess. *Medicin-Doctor und Chorherr Johann Heinrich Rahn 1749-1812.* Ein Beitrag zur Medizingeschichte der schweizerischen Aufklärung. Zürich: Verlag P. G. Keller—Winterthur, 1959, 132 pp., pt. (Thesis, University of Zurich).

Lyle M. Sellers. "Nihil sub sole novum." Reprinted from *Annals of Otology, Rhinology and Laryngology,* 1959, *68*: 777.

Richard H. Shryock. *Medicine and Society in America: 1660-1860.* New York: New York University Press, 1960, viii + 182 pp. $4.00.

Muḥammad Zubayr Siddiqi. *Studies in Arabic and Persian Medical Literature.* Calcutta University, 1959, xlviii + 173 pp. Ill. $5.00.

Henry E. Sigerist on the History of Medicine. Edited and with an introduction by Felix Marti-Ibañez. New York: MD Publications, Inc., 1960, xviii + 313 pp. $6.75.

Felix Uhl. *Amerikanische Medizin von Europäern beurteilt.* Zürich, 1959, 59 pp. (Thesis, University of Zurich).

Edward J. Van Liere. *A Doctor Enjoys Sherlock Holmes.* New York, Washington, Hollywood: Vantage Press, 1959, 141 pp. $3.00.

I. V. Vengrova et al. *Znamenatel'nye i yubileĭnye daty istorii meditsiny 1960 goda.* (Significant and commemorable dates in the history of medicine for the year 1960). 1960, 58 pp., 2 r. 60 k.

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LEONARD G. WILSON, Ph. D., currently Visiting Assistant Professor of the History of Science, Cornell University, Ithaca, New York, will be Assistant Professor, Department of History of Science and Medicine, Yale University, as of July 1, 1960.